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The Need for Cognition and Critical Thinking Skills and Depressive Symptoms in College Students

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Abstract

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MS, Walden University, 2009

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Dissertation Submitted in Partial Fulfillment

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Abstract

This dissertation concerns the relationship between the symptomatology of depression and cognition. The purpose of this study was to investigate the assumptions of Beck's negative cognition theory regarding the relationship between patients' lack of ability to reason and depression. Beck noticed that people with depression failed to consciously examine the basis upon which their negative self-defeating reality is founded. This study examined a relationship between critical thinking skills and the need for cognition (the desire to think about ambiguous information) and levels of depression and education. The participants were 75 postsecondary undergraduate and graduate students from both online and traditional universities. This study used two-way between ANOVAs. The participants completed the Zung Self-Rating Depression scale and the Need for Cognition scale, as well as the Ennis-Weir Critical Thinking Essay test. The findings showed no significant differences in scores between those with symptoms of depression and those without in terms of critical thinking skills and need for cognition. A reanalysis was performed to remove outliers in the data, which resulted in finding significant differences between education level and the need for cognition. These findings may suggest that the participants' desire to apply effort to thinking about ambiguous information or problems is related to education level. These findings might help promote positive social change by suggesting that other researchers examine the relationship between critical thinking skills and depression to add to this conversation.

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Chapter 1: Introduction to the Study

Background

One in six Americans experiences symptoms at some point in life that qualify as a diagnosis of clinical depression, as determined by the American Psychiatric Association (APA, 2000). Major depression is the leading global cause of years lost of a life due to the disorder (World Health Organization [WHO], 2009). People with major depression suffer personally and have difficulty meeting the practical responsibilities and emotional challenges of being productive members of society (Beck et al., 2011; DeVol & Bedroussian, 2007; Pratt & Brody, 2008). The APA (2000) associated depression with three classes of symptoms: (a) Mood symptoms, such as irritability or feelings of sadness or hopelessness most of the day or nearly every day; (b) physical symptoms, such as fatigue, weight changes, insomnia, and diminished interest or pleasure in all things; and (c) cognitive symptoms, such as a diminished ability to concentrate and indecisiveness. This researcher focused on the cognitive aspects of depression.

To understand human behavior, cognitive psychologists have sought a deeper understanding of the complex relationship between depression and cognition by studying cognitive abilities and function. One area of cognitive studies about depression has centered on the ways of thinking that might increase maladaptive behaviors (see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Seligman, Weiss, Weinraub, & Schulman, 1980). Cognitive researchers have tended to base the theory of what causes depression upon the premise that whether individuals develop depression from experiencing life stressors is determined by the ways that they think about their experiences or events

(Joormann, 2009). The research about cognition and clinical depression often has entailed searching for correlations between dysfunctional behavior and the thought patterns that seem uniquely linked to it.

Although people experience different degrees of pain and disappointment and are sometimes prone to biased and faulty reasoning, this type of reasoning is thought to be more common in people who are depressed (Beck, 1976). According to Beck (1976), people with major depression manifest constant, negative beliefs about life's events. Since the development of Beck's theory, researchers, such as Dent and Teasdale (1988), Lewinsoh, Steinmetz, Larson, and Franklin (1981) have found that a negative cognitive style of thinking plays a pivotal role in depression by possibly increasing the severity and duration of depressive symptoms. Hartlage, Alloy, Vázquez, and Dykman (1993) and Hertel and Rude (1991) suggested that individuals with depression lack of effort to analyze their seemingly automated thoughts is associated with depression because depression interferes with thought processes that require greater awareness and effort than automated thoughts do. Gotlib and Joormann (2010) suggested that the flexibility required to overrule automatic thought processes and reinterpret situations that trigger initial negative emotional responses might be compromised in people with depression, particularly regarding negative thoughts. Beck (1967) proposed that one or more of the following characteristics marks the cognition style present in the thoughts of people with depression about themselves, their events, and their experiences:

- The individuals fail to see how their biased statements are false or question their thoughts about their reality.

- The individuals tend to interpret information in ways that support negative conclusions without examining the truthfulness of those conclusions or the reliability of the information.
- The individuals tend to distort what they see by filtering out certain details of situations that contradict their predisposed points of view.
- The individuals tend to react to negative thoughts by harboring them. Instead of learning effective methods of coping with interpersonal life events, they continue to suffer from the symptoms of disorder.
- The individuals fail to engage in any effort to direct or control their thinking when thinking about themselves or their personal problems.

Davis (1982), Hammen and Krantz (1976), and Krantz and Hammen (1979) believed that they had confirmed Beck's theory that negative thinking in people who are depressed arises due to the unconscious mind that operates involuntarily and automatic. Hartlage, Alloy, Vázquez, and Dykman (1993) and Hertel and Rude (1991) suggested that individuals' lack of voluntary and controlled thinking or effortful thinking into analyzing their seemingly automated thoughts fuels depression. Gotlib and Joormann (2010) suggested that the flexibility required to overrule automatic thought processes and reinterpret situations that trigger initial negative emotional responses might be compromised in people with depression, particularly regarding negative thoughts.

According to Mayfield (2010), critical thinking is the conscious awareness of examining information or claims based upon a standard to develop truthful knowledge. Hartlage et al. (1993) indicated from a review of literature that people with depression

have several cognitive deficits when completing tasks that require effortful thinking, such as word-list recall and comprehension, and that people with depression tend to be less attentive to effortful thinking. An extensive search of the literature did not result in finding any studies that had been designed to examine a possible relationship between symptoms of depression and critical thinking abilities. Studying this gap might help to understand people with depression who tend to fail to examine negative thoughts for reliability and examine cognitive errors that relate to the problems that cause feelings of sadness and helplessness. New research about depression and cognitive deficits is required to provide mental health professionals with the tools they need to relieve the suffering of people who are or are expected to become afflicted in their lifetimes with debilitating depressive disorders.

Statement of the Problem

According to Beck (1967, 2008), negative thoughts are troubling to individuals with depression because such thoughts occur automatically and lead to selective attention being paid to events or experiences. Beck (2008) asserted that having negative automatic thoughts can interfere with normal thinking processes such as reasoning, reflecting about thinking, and problem solving, thus reinforcing negative attitudes. Beck also believed that people with depression are not able to take control of their negative thoughts by way of reasoning because of this interference. Beck's theories are now used predominantly to explain how negative thinking is a fundamental characteristic of people with depression and treat people with various mental disorders (Dent & Teasdale, 1988; Lewinsohn et al., 1981).

This researcher found only a limited number of researchers who have examined people diagnosed with depression for their ability to reason about hypothetical social situations. It was essential to address the gap in the literature because the problem related to whether people with symptoms of depression are effective at questioning and analyzing information deliberately or applying other core critical thinking skills that are fundamental to the ways in which people think still exists. The ways in which people with depression arrive at faulty conclusions or their inability to reexamine their negative beliefs can be associated with a negative mood state (Beck, 1967). The gap in the literature that this researcher addressed is whether the performance of critical thinking skills of college students with reported symptoms of depression is significantly different compared to college students with no reported symptoms of depression and their willingness and motivation to engage in the effort to think.

Purpose of the Study

The purpose of this quantitative study was to investigate some of Beck's central assumptions that people with depression experience an inability to apply reasoning to their negative thoughts. Beck (2008) suggested that depressive symptoms occur when negative thoughts or beliefs take over information processing so that information about experiences or events is perceived by the individual in negative and erroneous ways. Automatic negative schemas guide individuals' thinking processes about themselves and their worldg, subsequently preventing them from engaging in adequate reasoning about past events, current situations, and future expectations (Beck 1976). To study this hypothesis, this researcher compared the scores on Zung's Self-Rating Depression scale

(SDS), the scores on Cacioppo, Petty, and Kao's Need for Cognition Scale-Short Form (NCS-SF), and the Ennis-Weir Critical Thinking Essay test of a sample of postsecondary students with symptoms of depression. One of the independent variables (IVs) was the scores from the SDS. These scores indicated the participants' levels of symptoms of depression. The second IV was education level: Undergraduate or graduate.

Theoretical Basis

Beck (1976) observed that the symptomatology of depression includes deficits in reasoning ability and manifestations of abnormal reasoning styles. Beck theorized that patients with depression sustain their symptoms through cognitive predispositions or schemas. Schemas filter out positive details of situations that would threaten individuals' inherently negative and self-destructive mindset about themselves, their futures, and their world. By observing his patients, Beck found similarities in their thinking and suggested that there were two streams of thought: One was exposed during free association and centered on emotions, while the other was centered on unexpressed thought. Based upon their report, his patients appeared to have both types of thoughts. Beck referred to the parallel thoughts as automatic thoughts because they appeared rapidly and did not happen as the result of reasoning or reflecting about relevant events or topics or questioning the reality of the logic of automatic thoughts.

Beck (1976) also recognized that his patients tended to think in ways that reinforced their negative biases about themselves, which exacerbated their suffering. He also found that depressed patients who thought in such self-abnegating and self-punishing ways tended to make no effort to examine the reliability of the claims upon which they

based their thinking. A schema, he proposed, could explain such negative and erroneous thinking. Piaget (1952) described a schema as an organized structure that is a representation of an image or a model connected to other similar structures to constitute an entire grouping of schemas. Both theorists referred to a schema as a cognitive structure that forms in response to prior experience and serves to organize and categorize subsequent experiences.

Beck (1976) described the basis of these schemas resulting from depressed patients' childhood experiences as enduring and dominant thoughts that filter out unequivocally positive data in the process of making meaning from new experiences. He suggested that people with depression integrate their mental responses to unpleasant or unhappy childhood experiences into a triad of cognitive schemas that focus on the self, cumulative experiences, and perspectives about the future.

Negative self-referential statements such as "I will never get the job" or "I am too weak" often express these schemas. Once these cognitive structures are activated, other schemas become active, function automatically, and are dominant in the thinking process when the individuals experience new events or series of events. According to Beck (2008), triggering of the negative schema through environmental stimuli drives the already schematized subjective consciousness to accentuate the negative and construct an understanding of events that confirms a global negative perception of reality rooted in prior negatively evaluated experience and might manifest in such self-abnegating statements as, my unhappiness is affecting my relationships.

Disner, Beevers, Haigh, and Beck (2011) suggested that when an external stimulus activates a negative schema, it leads to the individual engaging in selection bias and selective interpretations of negative aspects of an experience. The frequent blocking out of positive aspects of the experience produces dysfunctional attitudes or beliefs. When individuals exercise bias by filtering out positive information that could support more positive inferences about events, there is an increased risk that they will reinforce negative embedded schemas. Filtering out important information that might be contrary to reality can contribute to individuals making faulty inferences regarding reality, which Beck (1967) called cognitive errors, or errors that could drive maladaptive behavior.

Beck (1967) divided the cognitive errors that can result from the domination of a distorted schema into six categories: (a) Arbitrary inference (drawing a conclusion without supporting evidence), (b) selective abstraction (selecting details and applying them without considering their original context), (c) overgeneralization (drawing conclusions about events or perceptions based upon isolated incidents or an otherwise insufficiently representative sample), (d) magnification and minimization (making erroneous and distorted evaluations about the significance of information or events), (e) personalization (interpreting events through the lens of self-interest when there is no warrant for doing so), and (f) absolutistic, dichotomous thinking (all-or-nothing thinking that interprets all experiences as being representative of one of two extremes). Beck contended that cognitive errors result in faulty inferences and unhelpful judgments that reinforce the negative self-concept and amplify the feelings of sadness, hopelessness, and loss of motivation associated with clinical depression.

Beck (1976) saw depressed patients' thinking as a self-destructive tendency of uncritically holding onto negative ideas about themselves and the world. Beck argued that employing a critical examination of negative, automatic thoughts for alternative contrary information might guide depressed patients to self-correct their negative, dysfunctional thoughts and restructure ill-formed, self-defeating thoughts. This researcher examined Beck's proposition of deficits in reasoning by looking at the degree to which the ability to think critically about information or ideas was present in a sample of participants with symptoms of depression.

Nature of the Study

This researcher conducted a quantitative study to investigate the effect of the IVs of symptoms of depression and education level on the dependent variables (DVs) of critical thinking skills and the willingness to engage in effortful thinking, think abstractly, or address complex problems. This study was a quantitative research based on methodology and statistical analysis techniques that allows for the examination of the data in terms of the theory upon which the hypotheses were drawn. The scores of the participants in the group who self-reported as having mild-to-severe symptoms of depression and scores that indicated no depression were compared for statistical differences. The scores on critical thinking skills and need for cognition based upon level of education were also compared for statistical significance.

This study was available for traditional face-to-face and online college and university students. Participants were from a postsecondary education target population because students attending college can experience high levels of distress. According to

the American College Health Association (ACHA; 2009), the college students who were surveyed reported that stress impeded their academic performance the most, and 14.9% reported having received a diagnosis of depression. Of that number of students, 32% reported a diagnosis during the past school year, and 24% reported currently receiving therapy for depression. Even higher percentages were found for the number of students currently in therapy and taking medication for depression.

This researcher used the SDS to identify symptoms of depression. Zung (1965) reported a global cutoff score for clinical depression of .50 or greater, and the severity of symptoms ranged from mild (.50 - .59) to moderate to severe ($\geq$ .60). Zung identified a control group with no depression to have an SDS indices from .25 to .43. Zung and King (1983) examined the SDS and found that 60% of 499 patients who met the *DSM* (3rd ed., APA, 1980) diagnostic criteria for major depressive disorder (MDD) scored an index of .55 or greater on the SDS.

This researcher compared those with self-reported clinical symptoms of depression to those with no self-reported clinical symptoms of depression. Zung (1965) reported a cutoff score of $\geq$ .50 an indication of the presence of clinical depression and an $\leq$ .43 as the highest index that represented no depression with a control group. Based on Zung's reported cutoff scores, this researcher used $\geq$ .50 and greater as the cutoff score on the SDS to indicate clinically significant symptoms of depression and $\leq$ .43 to indicate no presence of clinical symptoms of depression.

This researcher did not examine for differences in severity of depression among participants with symptoms of depression. As explained in Chapter 2, researchers have

examined for differences between participants with symptoms of depression and participants with no symptoms of depression and social problem solving scores. Depression has been associated with various cognitive deficits (Austin, Mitchell, & Goodwin, 2001). Among the number studies about depression and cognitive deficits is Ilamkar (2014) reported participants with no depression to perform significantly better on reaction time to a task compared to participants with depression. Moofoot, and O'Carroll (1995) and Murphy, Michael, Robbins, and Sahakian (2003) reported participants with no depression to perform significantly different on memory tasks compared to participants with depression.

What is known about a correlation between the severity of symptoms of depression and cognitive deficits is mixed (Rush, Weissenburger, Vinson, & Giles, 1983; Sweeney, Wetzle, Stokes, & Kocsis, 1989). Stordal et al. (2004) compared a group of 45 patients with recurrent nonpsychotic MDD with moderate to severe symptoms to a group of 50 healthy individuals on six neuropsychological tests. Stordal et al.` reported significant differences between members of the two groups on eight of the 10 cognitive tasks, which were measures of verbal fluency, inhibition, working memory, set-maintenance and set-shifting. Wang et al. (2006) assessed 57 clinically depressed participants with mild to moderate depression with either a first-episode of depression or had reoccurring episodes to 42 previously depressed participants, and 46 participants who have never been diagnosed as having depression on the California Verbal Learning test (CVLT). Wang et al. reported that there were no significant differences between the three groups, and no differences between individuals who had a first episode of depression and

those with recurrent depression. The severity of symptoms of depression was not correlated with vocabulary scores for this group. Grant, Thase, and Sweeney (2001) assessed 123 outpatients for MDD without psychotic features using a structured clinical interview and for the severity of symptoms using the Hamilton Rating scale for Depression (HRSD). A group with depression and a control group that comprised of 36 healthy individuals were tested on a battery of neuropsychological tests to evaluate cognitive functioning: Attention, motor speed, memory and learning, and executive processes. The results showed that there was an absence of significant cognitive impairment for the majority of the standardized cognitive tests in the group with major depression. In addition, the results showed that symptom severity was not associated with impaired functioning regarding attention, memory, executive functioning, or psychomotor functioning, but no significant differences were found for attentional shifting and psychomotor speed. Suslow (2009) compared 90 patients with unipolar depression or recurrent depressive disorder and a control group comprised of 30 female participants on the vocabulary subtest of the Wechsler Adult Intelligence scale (WAIS-R; Wechsler, 1981) and the Multiple-Choice Vocabulary test (MWT; Lehrl, 1999). Suslow reported that severity of depression did not account for score difference on neither vocabulary test. Part of the reason for the limited results supporting the correlation of severity of symptoms of depression and cognition may be due partly to the fact that researchers mentioned above examined different populations and compared different types of mood disorders.

Research Questions and Hypotheses

One principal hypothesis of this study was to show that participants whose SDS scores qualified them as depressed would score lower on critical thinking skills, as determined by the Ennis-Weir Critical Thinking Essay test, and for the need for cognition, as measured by the NCS-SF, than those whose scores did not show symptoms of depression. A second principal hypothesis was that there would be a main effect showing that participants with a graduate level of education would score higher than participants with an undergraduate level of education on critical thinking skills and need for cognition. A third principal hypothesis was that there would be an interaction showing that depression and education level would predict scores on critical thinking and need for cognition. Six research questions and hypotheses guided the study:

RQ1: Is there a difference in critical thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression?

H_{01}: There are no significant differences in critical-thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression.

H_{a1}: There are significant differences in in critical thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression.

RQ2: Is there a difference in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university undergraduate and graduate students?

H_{02}: There are no significant differences in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university students (undergraduate and graduate) who have no symptoms of depression and mild-to-severe symptoms of depression.

H_{a2}: There are significant differences in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university students (undergraduate and graduate) who have no symptoms of depression and mild-to-severe symptoms of depression.

RQ3: Is there an interaction between depression levels (no symptoms of depression and mild to severe symptoms of depression) and educational level (undergraduate and graduate) as they relate to critical thinking in university students, as measured by the Ennis-Weir Critical Thinking Essay test?

H_{03}: There is no interaction between the effects of depression levels (no symptoms of depression and mild-to-severe symptoms of depression) and educational level (undergraduate and graduate), as they relate to critical thinking skills in college students.

H_{a3}: There is an interaction between depression levels (no symptoms of depression and mild-to-severe symptoms of depression and educational level (undergraduate and graduate) as they relate to critical thinking skills in college students.

RQ4: Is there a difference in need-for-cognition scores, as measured by the NCS-SF, between college students who have no symptoms of depression and mild-to-severe symptoms of depression?

H_{04}: There is no significant difference in need-for-cognition scores, as measured by the NCS-SF, among undergraduate and graduate students with no symptoms of depression and mild-to-severe symptoms of depression.

H_{a4}: There is a significant difference in need for cognition scores, as measured by the NCS-SF, between undergraduate and graduate students with no symptoms of depression and mild-to-severe symptoms of depression.

RQ5: Is there a difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students?

H_{05}: There is no significant difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students, .

H_{a5}: There is a significant difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students.

RQ6: Is there an interaction between depression levels and educational levels as they relate to need for cognition in college students, as measured by the NCS-SF?

H_{a6}: There is no interaction between the effects of depression (no symptoms and mild-to-severe symptoms of depression) and educational levels (undergraduate and graduate) as they relate to need for cognition in postsecondary students, as measured by the NCS-SF.

H_{a6}: There is an interaction between the effects of depression (no symptoms and mild to severe symptoms of depression) and educational levels (undergraduate and graduate) as they relate to need for cognition in postsecondary students, as measured by the NCS-SF.

Operational Definitions

Critical thinking: Critical thinking is the cognitive process of examining information, assumptions, and arguments that have been proposed as the basis for a belief and scrutinizing it to develop truthful knowledge (Mayfield, 2010).

Depressive disorder: According to the *DSM* (4th ed; APA, 2000), depressive disorders are distinguished by symptoms which include feelings of sadness, emptiness, worry, irritability, guilt, and worthlessness that might be accompanied by social withdrawal and recurrent thoughts of death. Physical symptoms associated with depression include fatigue, agitation, sleep disturbance, and changes in weight. Cognitive symptoms associated with depressive disorders include difficulty making decisions, frequent negative thoughts, low self-esteem, trouble concentrating, psychomotor agitation or retardation, and indecisiveness.

Need for cognition: The need for cognition is the desire to structure the meaning of ambiguous situations by integrating information about past experiences with current events in useful ways (A. R. Cohen, Stotland, & Wolfe, 1955).

Social problem solving: Social problem solving is the process of solving, identifying, and providing positive solutions to ill-defined problems that occur in the real

world that cause individuals to be inhibited from functioning in a social environment (D'Zurilla, Nezu, & Maydeu-Olivares, 2004).

Assumptions, Scope and Delimitations, and Limitations

Assumptions

This researcher assumed that the participants would honestly meet the eligibility criteria and answer the instruments truthfully. The study was made available online so that enough postsecondary students at the two levels of education could be reached and declare an interest in and a willingness to participate in the study. This study used instruments accurately to assess the qualities that their developers purported them to measure.

Scope and Delimitations

The participants of this study were postsecondary students; therefore, the results are not generalizable to the target population of people with symptoms of depression who did not meet this criterion. Using online students as participants to the study gave this researcher the sample size needed to test the hypotheses. If there are differences in the participants' ability to apply critical thinking skills to personal or social situations, this researcher did not examine that relationships.

Limitations

The principal limitation of this study was that this researcher identified depression only based on the participants' self-reported symptoms on the SDS without confirmation based upon a structured interview from a mental health professional, as is normally required for a definitive diagnosis. Self-reporting measures of depression may not

sufficiently differentiate symptoms that indicate depression from other psychological states such as anxiety (Tanaka-Matsumi & Kameoka, 1986). This researcher did not determine whether scores of depression on the SDS indicating symptoms of depression could have been accounted for by another psychological state, such as anxiety. This study did not determine whether there was a correlation between severity of symptoms of depression and effortful thinking and critical thinking skills.

Marks and Yardley (2004) argued that self-reporting instrument require individuals to relate the questions to their subjective experiences, which might result in biased answers that the interviewer or this researcher has little control over. If study participants are not truthful when completing a self-report instrument, test results can be biased (Haworth, 2001). The underreporting of depressive symptoms or false subjective perceptions about behavior could result in biased data that could decrease the probability of finding statistically significant associations between the experience of depression and cognitive functioning.

Significance of the Study

The results of this study might have implications for positive social change by increasing awareness among professionals in the psychology field of the results. The ways in which people with symptoms of depression think about social problems influence the onset of a negative mood state. People with symptoms of depression might be assisted to help develop critical thinking skills or the willingness to think more critically through remedial education and therapy, particularly cognitive therapy and problem solving therapy.

Being capable of identifying thoughts and refuting them to form more truthful conclusions are cognitive tasks similar to critical thinking. For instance, learning to examine consciously the basis upon which an argument was made to reach the truth or analyze whether a conclusion was reasoned adequately are skills paramount to being a critical thinker (Mayfield, 2010). Glaser (1941) said that the ability to think critically requires two criteria: Knowledge about a process of logical inquiry and proficiency in applying that understanding to inquiry.

Negative thoughts, in the form of latent schemas, represent experiences that are activated by stimuli in the environment, which influence much of how new information is processed (Disner et al., 2011). When faced with social problems, individuals start a cognitive process of selecting alternatives that they believe can result in the most desirable outcomes and completing the problem solving process by implementing the chosen alternatives (D'Zurilla & Goldfried, 1968).

People respond to social problems differently. Some people respond in ways that result in desirable or positive outcomes; other people do not. According to previous research, the ways in which people approach social problems also is related to depression (Blalock & Joiner, 2000; Kuyken & Brewin, 1994). Holahan and Moos (1986); Kuyken and Brewin (1994), and Nezu (1985) suggested that there is an increased risk for developing emotional distress with an inadequate level of social problem solving ability. Nezu and Nezu (2010) said that individuals with impulsive problem solving styles might make careless attempts at resolving problems or not consider solution alternatives. They also commented that individuals with a tendency to avoid engaging in the problem

solving process might tend to overrely on other people to resolve problems. Helping patients to learn how to avoid dysfunctional coping regarding their social problems and respond in productive ways is at the core of problem solving therapy (Nezu & Nezu, 2010). According to Norris and Ennis (1989), critical thinking is fundamental to solving problems effectively. However, studies have not examined the relationship between the skill level of critical thinking among people with depression and those without symptoms or the application of such skills when faced with social problems and psychopathology.

Educational institutions can be another channel to deliver education regarding critical thinking skills. When given the opportunity to practice critical thinking skills, individuals have the opportunity to arrange and construct new knowledge, as well as engage in activities that have the potential to lead to greater success in life, such as in the workplace and leadership roles (Flores, Matkin, Burbach, Quinn, & Harding, 2012). However, individuals might not be able to apply cognitive skills effectively to their social problems if they have not developed the skill well. The findings of this study might bring greater awareness to the education field and suggest that students are encouraged to engage in effortful thinking. The results of this study did not identify cognitive deficits among postsecondary students with symptoms of depression. Other researchers might choose to conduct studies to determine whether the relationship between the symptomatology of depression and critical thinking skills and need for cognition should be expanded to examine for such deficits among other populations that could include psychiatric patients.

Summary

Included in this chapter is a discussion of the nature of the research and an examination of relationships between critical thinking ability, inclination to think, and symptomatology of depression between undergraduate and graduate university students. The focus of this study was to investigate whether there were significant decreased differences in the ability to think critically and devote effort to thinking of a sample of participants with symptoms of depression compared to participants with no symptoms of depression.

This researcher used the NCS-SF and critical thinking skills as the basis for determining, with the aid of SPSS v. 20, whether differences occurred among a sample of 75 participants whose self-reported symptoms identified them as depressed, according to the SDS typically in their willingness to engage in effortful thinking. In Chapter 2, this researcher provides a detailed review of scholarly literature regarding cognitive dysfunction associated with depression and discusses the importance of examining depressed patients for critical thinking deficits. This researcher also explains the symptomatology of depression and the effort to reason, along with the IVs and DVs of the study.

Chapter 2: Literature Review

Background

Depression affects the lives of many people in the United States and worldwide. In 2010, according to the U.S. Department of Health and Human Services (USDHHS, 2012), an estimated 45 million (19.83%) adults 18 years of age and older in the country had experienced a mental illness during the past year. An estimated 15.5 million (6.8%) adults had reported experiencing at least one major depressive episode during the previous year.

The number of people in the United States whose lives have been affected by depression is wide-spread (Angst, 1995; DHHS, 2012; Kessler et al., 2005), and scientific knowledge about depression and its etiologies continues to increase. Hidaka (2012) suggested that the causes are multifaceted, and might include an increased rate of obesity, a diet lacking in fruits and vegetables, low in fiber, and high in fats and sodium, a reduced level of physical activity, and decreased exposure to sunlight and inadequate sleep. Changes in an individual's social interactions can lead to the person being isolated, as well as other modern pressures, are among some of the potential causal factors that Hidaka mentioned as causing the wide-spread number of people affected by depression.

One generally accepted fact associated with depression is that decreased cognitive ability might increase individuals' vulnerability to experiencing symptoms of depression (Ingram, Miranda, & Segal, 1998). According to Cohen (1992) and Ingram (2003), the ways in which individuals perceive and think about an event or a series of events can precipitate negative thoughts, which can affect judgments, realities, and behaviors, as

well as emotions or moods. The negative thinking of individuals with depression has consequences because of how the ways in which negative thinking about interpersonal and intrapersonal issues can affect their day-to-day functioning and ability to make decisin on their own (Beck, 1964; D'Zurilla et al., 1998; Gotlib & Asarnow, 1979; Haaga, Fine, Terrill, Stewart, & Beck, 1995; McCoullough, 2003; Murphy et al., 2001; Nezu, 1985). This researcher did not locate any studies about depression that offered detailed examinations of the dysfunctional reasoning due to social and personal problems that might underlie the inability of people with depression to accomplish critical thinking cognitive tasks successfully.

This chapter is a review of the literature regarding the relationship between depression and cognition. The chapter begins with a discussion of the different definitions of critical thinking and how researchers have examined the ways in which people cope with life stressors in connection to depressive symptoms. The chapter includes a discussion of areas of research regarding deficits in social problem solving abilities, biased thinking, and reasoning skills related to the experience of depression.

Search of the Literature

This researcher retrieved the studies cited in this literature review primarily through Walden University's online EBSCO databases of peer-reviewed journal articles including Academic Search Premier, PsycARTICLES, PsycINFO, MEDLINE, ERIC, Education Research, SocINDEX, and ProQuest. Multiple scholarly journals and organizations were accessed, including ScienceDirect, government organizations, PubMed, the Institute of Education Sciences, and the National Commission on

Excellence in Education. The key terms used in searching for relevant literature included *depression, problem solving, negative thinking, biased thinking, thought suppression, rumination, critical thinking,* and *cognitive deficits*.

This researcher was not able to find any studies directly related to the ability of people with depression to reason deliberately in hypothetical situations or apply self-analysis to their thinking. The search was widened to locate articles about the relationship between the symptomatology of depression and cognition to include problem solving skills and reasoning skills because of the ways in which educators, researchers, and philosophers have related these terms to sound reasoning that is characteristic of critical thinking. Initially, this researcher searched for studies within the last 5 years. Because only a limited number of studies conducted within that period that pertained to the problem being studied were located, the search was widened to include earlier studies that were pivotal to understanding the nature of the problem between cognition and the symptomatology of depression.

Cognition and Depression

Beck (1967); Gilbert (2001); Ingram et al. (1998); Joormann (2009), and Luciani (2001) have suggested that the ways in which individuals with depression think about themselves and their future leads to maladaptive emotional responses. Alloy and Ahrens (1987); Ellis (1976); Macavei (2005), and Miranda and Mennin (2007) have reported that individuals who are experiencing depression have pessimistic thoughts about future events and hold irrational beliefs such as “I’ll never be loved”. Quelhas, Power, Juhos, and Senos (2008) found that college students with reported depression tend to think that

they are less in control over future events compared to students with no reported symptoms of depression. It is these kind self-defeating thoughts that has the potential to cause negative emotional responses.

Beevers and Meyer (2004); Conway, Howell, and Giannopoulos (1991); Wenzlaff, Wegner, and Roper (1988), and Williams, Mathews, and MacLeod (1996) reported that individuals with depression seem unable to suppress or redirect unwanted and repetitive negative thoughts. Sheppard and Teasdale (2000) and Williams et al. (1996) reported that individuals with depression have a reduced ability to challenge and reconstruct negative thoughts and have an increased tendency to ruminate about events and experiences that they perceive as being negative. Halpern (2003) said that what people know about the world is constituted through a process of evolving representations in which new ideas are absorbed into structures of previously stored knowledge. When negative cognitive structures, according to Beck (2008), are activated by stress, it gives rise to processing new experiences and events in negative ways.

Critical Thinking

Another important term in this study was critical thinking. Norris and Ennis (1989) defined critical thinking as a process of rational thinking that prepares individuals to make sound judgments when deciding what to believe or do. In the process of making judgments or deciding on courses of action, Norris and Ennis suggested that the quality of the outcomes of the judgments depend on the extent of the individuals' reasoning about the information available to them. Sternberg (1986) and Halpern (2007) asserted that when individuals apply critical thinking to their problems, their probability of

achieving their set goals increases. Within the field of psychology, R. Sternberg (personal communication, July 31, 2012), agreed with the view that critical thinking is a cognitive skill.

In 1988 and 1989, a panel of experts on critical thinking from the fields of philosophy, social sciences, and physical sciences agreed upon six skills that they considered core characteristics of critical thinkers (American Philosophical Association, 1990). These skills include: (a) interpretation, or comprehension, of the meaning of information and categorizing information in a meaningful way so that the relationships or communication between statements or concepts are clear and unambiguous; (b) analysis, or examination, of the relationships between and among ideas, including how they are combined to produce judgments; (c) evaluation, or recognition, of the accuracy or reliability of received information and of conclusions generated from one's own thought process; (d) inference, or the drawing, of conclusions not immediately obvious on the basis of available information; (e) explanation, or expression and justification, of one's reasoning in words so that they will be available for further review; and (f) self-regulation, or the monitoring, of one's own thoughts to disregard erroneous or overly subjective judgments. The panel of experts also suggested that critical thinkers not only tend to use critical thinking skills in the process of logical inquiry but also aspire to ponder their thought processes to arrive at the most warranted judgments. In this view, critical thinkers must always have the knowledge and the ability to suspend judgment regarding what to believe or do until they have sufficient information available to do so,

have verified that the information is as accurate as possible, and have carefully reasoned what it could mean before arriving at a conclusion (Mayfield, 2010).

Critical thinking was important to this study because once individuals have processed information about their events or experiences, coping responses usually occur. It is during cognitive processing of information that cognitive errors are inevitable. For instance, the biased assimilation effect is a phenomenon in which people, irrespective of whether they have depression or not, show a greater tendency to credit new information that is consistent with what they already believe than they do toward information that contradicts it (C. G. Lord, Ross, & Leeper, 1979). C. G. Lord et al. (1979) hypothesized that people tend to dismiss data or mixed findings as being unreliable and inconclusive if it disconfirms one's current beliefs. Another cognitive error is belief polarization. This cognitive error occurs when individuals' responses to what they perceive as disconfirmatory information amplify their commitment to their original beliefs. Kardash and Scholes (1996) provided a demonstration of belief polarization in their investigation of how people decide whether to believe that HIV causes AIDS. Kardash and Scholes found that the more certain participants were about their knowledge of the disease, the more likely they were to ignore inconclusive information that tended to challenge their thinking.

Social and Personal Problem Solving

The work of pioneers in this field of study, namely, gestalt psychologist Duncker (1945); psychiatrist and psychoanalyst Hartmann (1958), one of the founders of ego psychology; and psychologist Jahoda (1958), considered one of the founders of positive

psychology, inspired a general agreement in the psychology field that emotional distress or conflicts can arise when individuals do not know how to resolve problematic situations. Hartmann and Jahoda each stressed that being able to cope with and adapt to the continuous presence of personal problems rests on the ability to solve and manage new problems effectively. After having noted that people with symptoms of depression frequently report that making decisions and addressing personal problems are stressful tasks for them, McLean (1976) suggested that a common feature of depression is difficulty with problem solving. McLean argued that although all people experience life stressors, whether they also experience symptoms of depression depends upon their ability to deal with new problems that arise by applying coping skills such as effective decision making and problem solving.

Using an avoidance problem solving style predominantly rather than passive strategies to tackle personal problems is correlated to some degree with the presence of psychological disorders (Holahan & Moos, 1986; Kuyken & Brewin, 1994; Nezu, 1985). Holahan and Moos (1986) found from their longitudinal study that a passive problem solving style is correlated with the experience of psychological distress. Holahan and Moos randomly selected families in a major city, and they reported that the participants who tended to use an active coping style experienced fewer negative psychological consequences after experiencing life stressors than individuals who tended to use a passive coping style to solve problems. Billings, Cronkite, and Moos (1983) examined coping styles and depression of 409 patients with depression seeking psychiatric treatment and a control group comprised of 409 local random households in the

community. Participants from both groups took the Health and Daily Living form (Moos, Cronkite, Billings, & Finney, 1982) the Family Environment scale (Moos & Moos, 1981), and the Work Environment scale (Moos 1981). Participants also reported the number of stressful events during the past year on the Schedule of Recent Events (Holmes & Rahe, 1967) and their style of coping on an instrument revised by Billings & Moos, 1981). The results showed that those who were seeking treatment for depression were less likely to initiate solving their problems and more likely to respond in emotional ways than a control group without symptoms of depression. Billings, Cronkite, and Moos concluded that the emotional coping responses of the individuals in their study were linked to problem solving.

Nezu (1985) examined the relationship between ineffective problem solving and the risk for experiencing symptoms of depression. He asked the college student participants to complete the Beck Depression inventory (BDI; Beck, Rush, Shaw, & Emery, 1979); report their levels of anxiety, levels of perceived control, and current stressors; and then report their perceived ability to solve social problems effectively on the Problem-Solving Inventory (PSI; Heppner & Petersen, 1982). The results showed that the more often the participants reported symptoms of depression and anxiety, the more often they reported experiencing more frequent life problems, less control over their problems, and higher levels of stress than individuals who perceived themselves as being effective problem solvers.

Examination of Problem Solving Deficits and the Symptomatology of Depression

Duncker (1945) proposed that when individuals encounter an ill-defined problem, where the initial problem and end goal are known, they usually start searching for ways to achieve the end goals. One method of examining people with depression for their ability to problem solving is by using Duncker's theory about how to solve ill-defined problems, which can be measured by asking participants to create a middle, or a mean, explanation that bridges the beginning and end of hypothetical, real-world stories to produce effective outcomes.

Some people develop symptoms of depression, but others do not. Marx, Williams, and Claridge (1992) and Nezu and Ronan (1985) have suggested that one reason for the difference in whether individuals develop symptom of depression lies in how they think about and solve personal problems. The work of Platt and Spivack (1972) was foundational in studying the relationship between psychopathology and social problem solving, which was based upon the pioneer work of Jahoda (1958). Platt and Spivack examined participants who were adult psychiatric patients and had been hospitalized or were receiving care from a mental health center for mental illness (i.e., diagnosed as schizophrenia in 70% of the participants). The participants completed an instrument with a set of nine mean ends stories and rated their own perceived social competence levels. The results showed that being able to provide alternative solutions that would direct individuals toward end goals to hypothetical, real-life problematic situations was associated with lower levels of proficiency among the psychiatric patients in their study.

Platt and Spivack (1974) extended their first study by exploring differences in social problem solving among psychiatric patients. Participants were placed into three groups: a group of adult psychiatric patients, a normal group of beautician school students, and a second normal control group of hospital employees without symptoms of depression. Participants in each group completed an instrument with a set of nine mean ends stories. The adult psychiatric patients were less able than the other two groups of participants to generate solutions to the stories that would direct the story towards an effective solution. The patient group provided answers that were more simplistic and less thought out than those given by the individuals in the control group that did not have mental illness. Overall, the individuals in the psychiatric group thought and reflected less about effective solutions than did the individuals in the other groups. Platt and Spivack's results supported the existence of deficits in the ability to construct effective solutions and to rationalize effective courses of action.

In a 1975 study, Platt, Siegel, and Spivack also examined whether there would be a difference in the abilities of men and women to solve hypothetical social problems. Plat, Siegel, and Spivack reported a difference between the male and female patients' ability to generate means to personal and interpersonal problems compared to a normal control group, but no difference between the two groups in their ability to recognize the effectiveness of the means that they had created. However, the participants in the normal control group seemed more likely to think about the problem, whereas the psychiatric patients tended to give more instantaneous responses. The results were congruent with researchers Anderson, Goddard, and Powell (2011), D'Zurilla et al., (1998); Haaga et al.,

(1995); Heppner and Anderson (1983; Marx and Schulze (1991); Marx et al., (1992), and Nezu and Ronan (1985) showing deficits in the problem-solving process among people with symptoms of depression.

D'Zurilla and Maydeu-Olivares (1995) defined problem solving as an action or a response to any real-life circumstance or task that requires the individual to find a solution to solve a problem that has no apparent solution. Responses to problem solving include behavioral responses D'Zurilla and Goldfried, 1971). According to D'Zurilla, et al. (2004), the problem solving responses or styles that individuals use to resolve social problems determine the effectiveness of their attempts. For example, coping with social problems by using rational problem solving can result in resolution of the problems, whereas using a dysfunction problem-solving style such as impulsivity, carelessness, or avoidance can result in negative outcomes, such as giving up and the problems continuing to provoke emotional distress.

D'Zurilla, et al. (2004) stated that social problem solving involves behavioral responses to ill-defined problems that occur in the real world. To resolve ill-defined social problems effectively, D'Zurilla and Goldfried (1968) suggested that two elements are necessary: problem orientation and problem-solving skills. D'Zurilla, et al. (2004) defined problem orientation as a general disposition or an attitude toward approaching a social problem in which the individual appraises the problem and believes that the problem is solvable through committed effort. Within the model, D'Zurilla, et al. defined problem solving skill as the response to an ill-defined social problem by attempting to

understand the situation and cope with it by determining what action needs to be taken to reach the end goal effectively.

Empirical Evidence About the Relationship Between Depression and Social Problem Solving Skills and Problem Solving Orientation

Two particular correlations between depression and social problem solving have been reported. Holahan and Moos (1986); Kuyken and Brewin (1994); and Nezu (1985) reported that an increased risk for developing emotional distress is greater among individual's with inadequate levels of social problem-solving ability. D'Zurilla et al., (1998) and Gotlib and Asarnow (1979) reported that their participants with depression had social problem-solving deficits. A five-step problem-solving model developed by D'Zurilla and Goldfried (1968) has helped researchers to examine which steps of a problem solving process participants with depression have deficits performing. The model by D'Zurilla and Goldfried has five steps that the problem solver initiates to reach a solution to a problem: (a) orientation: being aware that a problem exists and developing a mind-set to attempt solving the problem, (b) problem definition and formulation: clearly identifying the problem and setting objectives to solve it, (c) production of alternatives: searching for as many solutions to the problem as possible, (d) decision making: considering which solution to the problem is the best one, and (e) verification: evaluating the solution to the problem. Nezu (1987) suggested that depression could be associated with the unsuccessful completion of any part of the problem solving process, a contention that D'Zurilla and Maydeu-Olivares (1995); D'Zurilla et al. (1998); Haaga et al. (1995); Marx and Schulze (1991); and Marx et al. (1992) have since corroborated.

Marx et al. (1992), for instance, found that experiencing depression and solving hypothetical social problems are related. Participants in their study fit the clinical definition of depression, according to the research diagnostic criteria (Spitzer, Endicott, & Robins, 1978), and a list of criteria that Spitzer et al. (1978) developed to improve the diagnostic procedures of psychiatric disorders and reduce the risk of having false positive diagnoses. The participants had a BDI score of 18 or more. The sample also comprised a clinical control group of patients who had been diagnosed with different forms of anxiety disorders but did not meet the criteria for MDD (obsession, hypochondriac disorder, social phobias, and a combination of anxiety and depressive disorder) and a control group without symptoms of depression. The participants completed the Means-Ends Problem-Solving instrument (MEPS; Platt & Spivack, 1975), reported personal problems similar to those on the MEPS, and the most probable strategies that they would use to solve their problems. Marx et al. (1992) reported that the individuals with clinical depression showed greater impairment in their abilities to develop solutions to the problems and in their strategies (orientation) to address the problems when compared with the nonclinical group and the clinical control group.

As previously indicated, the first step of D'Zurilla et al.'s (2004) problem solving model is problem orientation, the style or strategy in which a person approaches solving a social problem. According to D'Zurilla et al., when a person fails to approach their problem rationally, this is a dysfunctional attempt. D'Zurilla et al. suggested that using passive problem solving to resolve social problems is a dysfunctional response that does not require individuals to take an active role in solving their issues in productive ways.

Kuyken and Brewin (1994) found a correlation between depression and the passive coping style labeled as avoidant. The sample comprised of female participants who met the *DSM-R* (3rd ed., APA, 1987) criteria for a diagnosis for major depression and female participants without psychiatric diagnoses. The participants completed the BDI, reported prior stressful events that they had experienced, and reported about their coping styles on the Ways of Coping questionnaire (Folkman & Lazarus, 1988). The results showed that the in-patients with depression reported using passive problem solving styles (escape avoidance coping) more often than the control group when faced with stressful interpersonal situations.

Blalock and Joiner's (2000) study confirmed Kuyken and Brewin's (1994) results about passive problem solving style and depression as well as level of anxiety. One hundred seventy-nine college students participated in the study. Participants reported their methods of problem-solving orientation responses on the Coping Responses inventory (Moos, 1988), which identifies coping style (e.g., avoidant problem solving such as trying not to think about the events, wishing the problems would go away on their own, or planning to escape the situations), and the Negative Life Events questionnaire (Saxe & Abramson, 1987) to identify the types of personal problems that the participants experienced and how frequently they experienced them over 3 weeks. Depression and anxiety were identified when the participants completed the BDI (Beck et al., 1979) and the Beck Anxiety inventory (Beck, Epstein, Brown, & Steer, 1988) for their level of anxiety. When the participants recalled the most important problems that they had faced over the last year and indicated their styles of coping to resolve the issues, the female

participants who having stressful conditions reported using avoidance problem solving orientation also reported having more symptoms of depression and anxiety compared to men

Nezu's (1985, 1986) research results were congruent with those of other studies about depression and problem solving orientation. Nezu (1985) assessed undergraduate college students for level of depression, had the participants report their own appraisals of how they approached solving social problems, and report their perceived levels of confidence about problem solving and their perceived abilities to control their problems on the PSI. Nezu reported that the presence of high levels of symptoms of depression was positively correlated with having low problem solving confidence, approaching solving problems with an avoidance problem solving style, and feeling a lack of personal control.

Haaga et al. (1995) extended Nezu's (1985, 1986) work by demonstrating the presence of a deficit in social problem solving orientation and problem solving skills. The participants in this study were college students who completed the BDI, the inventory to Diagnose Depression, and the SPSI. Haaga et al. found that the students with higher reported symptoms of depression also reported having negative problem solving attitudes and tended to perceive themselves as having low levels of control over their problems compared with those college students who had lower levels of reported depression. Despite this result, Haaga et al. did not report any differences in problem solving skills between the two groups. Haugh (2006) found a relationship between depression and problem orientation. When the college student participants in Haugh's study completed the BDI and indicated how they tended to approach solving social problems on the SPSI-

R, the students with symptoms of depression more often preferred to use negative problem orientations (e.g., avoidant and impulsive careless styles) rather than positive problem orientations.

The findings of all the aforementioned studies suggest that individuals with depression tend to perceive their own abilities to solve personal problems negatively. Furthermore, a review of the studies listed here about problem solving orientation have shown that measuring attitudes toward attempting to resolve personal problems can predict the ways in which individual's approach solving them. D'Zurilla et al. (1998) demonstrated that whether individuals used a positive or a dysfunction problem solving orientation could predict the style in which the individuals solved problems. The participants were undergraduate college students who indicated how they tended to respond to social problems on the SPSI. The results showed that the participants who reported using positive problem-solving orientations (i.e., productive attitudes to approach problem solving) also reported using rational problem solving styles, and participants who reported using a negative problem solving orientations (i.e., dysfunctional or passive attitudes) reported using passive problem-solving styles.

Together, the findings from the studies reviewed here also suggest some degree of relationship between the presence of depressive symptoms and the tendency to approach solving social problems with a negative orientation and without using any concerted effort (See Blalock & Joiner, 2000; Holahan & Moos, 1986). In addition, some of the studies listed here have reported a relationship exists between depression and difficulty with the problem solving process (Blalock & Joiner, 2000; D'Zurilla et al., 1998).

Empirical Evidence About the Relationship Between Depression and Distorted Thinking and Reasoning Skills

Beck (2008) theorized that when a dormant negative schema becomes active because of a life event such as a personal loss, the active schema directs thinking in such a way that the individual fails to consider positive alternatives to his or her negative thinking. Beck (2008) referred to this action as automatic thinking because the cognitive process leads individuals to filter out conflicting stimuli that could counteract negative thinking; thus, the individuals interpretation of new experiences or events is biased. When people do not evaluate their thoughts, ideas, or information for truth, automatic thought processes control their thinking, making their judgments more prone to cognitive errors (Beck, 1967).

Beck (1967) categorized these cognitive errors as arbitrary inference, selective abstraction, overgeneralization, magnification, personalization, and dichotomous thinking. Arbitrary inference is the result of a person drawing conclusions prematurely without enough relevant information. Selective abstraction occurs when a person forms conclusions that are based upon limited information. Overgeneralization occurs when a person's specific beliefs about events are made that result in a current conclusion about the event as well as conclusions about similar events. Magnification happens when a person overestimates information about events. Personalization involves forming personal connections with events without sufficient evidence to do so. Dichotomous thinking involves a person making extreme statements of beliefs.

Although few researchers have examined Beck's (1967) theory about the process by which people with depression are vulnerable to erroneous thinking, Krantz and Hammen (1979) did find in their study a relationship between the presence of depression and cognitive errors proposed by Beck (1967). The participants were college students, psychiatric patients, and outpatients no longer diagnosed with depression, who interpreted short descriptions of problematic situations and selected predesigned answers that represent most likely how they would feel about being in a similar situation. The predesigned answers were developed to represent the cognitive errors Beck (1967) proposed about the negative cognitions of people with depression, such as overgeneralization, arbitrary inference, and selective abstraction. The results showed that the participants who interpreted the situations in distorted ways had the highest levels of depression. Rude, Wenzlaff, Gibbs, Vane, and Whitney (2002) also found a correlation between negative biased thinking and depression. The participants were college students who completed the BDI and the White Bear Suppression inventory (Wegner & Zanakos, 1994), which instructs people to form sentences from scrambled words while being asked to remember six-digit numbers. The results showed that the students who had a high tendency to form negative sentences (e.g., "I am stupid") were more likely to report having depression symptoms 4 to 6 weeks later.

White, Davison, Haaga, and White (1992) demonstrated that the cognitive errors proposed by Beck (1967) were found to be deficits among people with symptoms of depression. Participants were psychiatric outpatients diagnosed by a psychiatrist according to the *DSM* (3rd ed., APA, 1980) criteria for depression. The participants

listened to simulated situations that were positive, negative, and neutral in nature, and imagined that the situations were real and involved themselves. Then they talked aloud while coders interpreted their thoughts. The research coders rated and categorized the participants' thoughts into the cognitive error categories proposed by Beck. White et al. reported that although there were no significant differences among the participants when the simulated situation was neutral or positive, the individuals who had depressive symptoms exceeded those who did not on the total cognitive bias score when the simulated situation was a depressing one.

Beck (1976) explained that his patients' reasoning about their realities of themselves and their world was illogical because they were making erroneous inferences and hasty conclusions. Leighton (2004) defined reasoning as a cognitive process of developing new conclusions based upon underlying principles and the existence of evidence. Baker and Channon (1995); Channon and Baker (1994); and Silberman, Weingartner, and Post (1983) have conducted empirical studies about depression and reasoning have demonstrated some degree of relationship between the presence of depression and deficits in automatic and effortful reasoning tasks . Baker and Channon's (1995) results supported those of earlier researchers who also had found a correlation between depression and reasoning abilities. The participants in Baker and Channon's study were undergraduate college students who reported symptoms of depression on the BDI and completed a learning task involving identifying which cards containing various stimuli (e.g., size, color, or position) were the correct ones. Baker and Channon reported that the individuals with reported symptoms of depression were less efficient at providing

correct hypotheses and responses after receiving positive or negative feedback, and also provided fewer correct solutions than the individuals in the control group.

Silberman et al. (1983) found that deficits in reasoning ability among people with symptoms of depression existed. The participants were college students who completed the BDI and an abstract learning task that involved a series of visual discrimination card problems. Silberman et al. suggested that there were deficits because the individuals in the group with reported symptoms of depression were less focused on the tasks and reported fewer correct responses than the control group.

Channon and Baker (1994) conducted a study with university students with and without reported symptoms of depression on the BDI. The participants completed a syllogistic problem by drawing conclusions from two premises to assess their ability to reason. Channon and Baker reported that although there was no significant difference between the groups on the total amount of time used to complete the syllogistic problems, individuals in the group with symptoms of depression performed more poorly overall because they made more errors. The findings of the reviewed studies about the relationship between depression and reasoning skills suggest that having difficulty thinking is more likely to occur when individuals experience symptoms of depression.

Limitations in the Literature About the Relationship Between Depression and Problem Solving Skills and Reasoning Skills

Anderson, Goddard, and Powell (2011); Blalock and Joiner (2000); Doerfler, Mullins, Griffin, Siegel, and Richards (1984); D'Zurilla et al. (1998); Marx and Schulze (1991); and Nezu (1986) found a consistent relationship between the symptomatology of

depression and social problem-solving deficits. However, researcher Haugh (2006) reported mixed results, possibly because only a few researchers have studied samples composed of other than college students rather than individuals diagnosed with clinical depression. Researchers who have examined psychiatric patients have found consistency between the existence of depression and the presence of deficits in social problem-solving skills (Marx et al., 1992; Platt & Spivack, 1974).

Marx et al. (1992), for instance, addressed the issue of using college students as participants by comparing patients with depression to a control group of participants with no symptoms of depression and a second clinical group identified as having different forms of anxiety disorders, but not meeting the criteria for MDD (obsession, hypochondriac disorder, social phobias, and a combination of anxiety and depressive disorder). Participants completed the MEPS and reported how they tended to solve their own problems. The participants who met the clinical criteria for depression showed greater difficulty in creating relevant means to solving hypothetical problems and when trying to solve their own personal problems than did the participants of the control group.

Another possible reason for the mixed results in the literature is that few researchers who have examined the relationship between depression and problem solving abilities have assessed problem solving abilities when the problems have been the participants' personal problems. To address this issue, Anderson, Goddard, and Powell (2009) provided evidence of differences in the ability to solve hypothetical social problems and personal problems. The participants in their study were college students who reported for a period of 2 to 4 weeks how they solved their own real-life problems.

Anderson et al. coded the participants' responses as being either functional, avoidant, or impulsive careless. The results showed that the group with reported symptoms of depression used a negative problem-solving orientation and appraised their problem solving efforts as having an avoidant problem-solving style. However, neither group performed significantly better than the other when the tasks involved solving hypothetical social problems on the MEPS. Perhaps performance on hypothetical social problems and actual personal problems might be different because they might not involve the same level of self-evaluation.

The inconclusive and mixed results in the studies included in this literature review also might have been the result of the different levels of depression of the participants in the various studies. Most of the studies discussed in Chapter 2 of this dissertation examined a relation between depression and social problem-solving deficits using samples of college students screened for MDD using a self-reporting depression inventory, namely, the BDI and a lower cutoff score indicating that only minimal depression might have been used. Marx et al. (1992) recommended a higher cutoff score for such research in the future.

In addition, researchers Anderson et al. (2011) and Marx et al. (1992) have questioned the validity of the MEPS, which is scored on the number of means that the test taker generates and the effectiveness of the means provided. D'Zurilla et al. (1998) argued that the MEPS might be unreliable for measuring specific problem-solving deficits because it assesses only the quality of the means to solutions to problems provided by the test takers. The MEPS does not assess the ability to create solutions to

social problems or evaluate the consequences of particular solutions in an effort to select the most appropriate solutions, as D'Zurilla and Goldfried's (1968) problem solving model suggested are part of the problem-solving process. As a result, D'Zurilla et al. (1998) posited that some researchers might have made erroneous conclusions about the relationship between the symptomatology of depression and social problem solving deficits if their analyses had been based solely upon providing a means to solve problems on the MEPS. He suggested that such poor test results could be indicative of other deficits such as problem-solving orientation or difficulties comprehending the MEPS questions.

Researchers have not determined whether once individuals' depressive symptoms are relieved that their problem-solving skills increase and that they no longer experience difficulty solving personal problems that were causing them emotional distress. Researchers also have not been able to dismiss confounding variables, such as whether deficits in thinking precede experiencing symptoms of depression or whether high performing critical thinkers are more effective at social problem solving. The studies in this literature review were limited in that they showed only correlations between cognition and the symptomatology of depression; they did not show causation.

Critical Thinking Skills Among Postsecondary Students

Universities and colleges tend to have a mutual goal of teaching critical thinking skills to students. Dunwoody, McKellop, Baney, and Hafer (2013); Huhn, Black, Jensen, and Deutsch (2013); King et al. (1990); and Lehmann (1963) have supported the idea that developing critical thinking skills is one result or byproduct of a postsecondary

education. One of the earliest studies that showed a correlation was conducted by Lehmann (1963), who found that graduate students made significant gains in critical thinking skills between the time they entered the university and 4 years later as senior students.

Dunwoody et al. (2013) administered the Watson-Glaser Critical Thinking appraisal (WGCTA; Watson & Glaser, 1964); the CCTST (Facione & Facione, 1994); and an instrument that the researchers developed, the Psychological Critical Thinking inventory that assesses students' ability to evaluate claims made in studies, press articles, and peer-reviewed journal articles, to 164 undergraduate psychology students. The results showed that senior psychology students scored significantly higher than first-year students on the WGCTA and the CCTST. Huhn et al. (2013) reported that 63 university students enrolled in two different doctor of physical therapy programs who completed the Health Science Reasoning Test (Facione & Facione, 2006) at the time of entry saw significant gains in their critical thinking abilities when tested prior to graduating from the program.

Mines, King, Hood, and Wood (1990) found differences in critical thinking abilities between undergraduate first-year students and seniors as well as graduate college students on the WGCTA, the CCTT, and the Reflective Judgment Interview (RJI; Kitchener & King, 1985). The results showed that the more educationally advanced students scored higher than the lower educational students did. In addition, when academic aptitude was controlled for, increases in critical thinking skills still occurred across the three levels of education. Mines, King, Hood, and Wood suggested that critical

thinking skills increased with higher educational experience not accounted for by increases in academic aptitude. Shin, Jung, Shin, and Kim (2006) found significant differences between associate and baccalaureate nursing students on critical thinking skills, as measured by the CCTST (Facione & Facione, 1994).

Whether critical thinking skills increase as a result from having taken a course specifically developed to teach critical thinking skills or developed in general from courses that integrate critical thinking skills into the curriculum or teaching compared to not taking either type of course has not been fully examined. Facione (1990) concluded that a course specifically designed to develop critical thinking skills or a course whose curriculum or teaching incorporated critical thinking skills would increase the critical thinking abilities of students enrolled in such courses more so than the critical thinking skills of students not enrolled in such a course. In this study by Facione, 945 students who had taken a critical thinking specific course completed a pretest and a posttest. The results showed significant gains in critical thinking abilities as the result of taking a critical thinking course. The control group comprised of college students who had taken an introductory philosophy course; no significant gains in critical thinking abilities were identified in this group. In the same study, Facione included 232 pretest and posttest critical thinking scores of students who had taken either an introduction to psychology course, two different philosophy sections, or a reading course. The results showed that the students who had completed a critical thinking course showed more improvement than their counterparts in critical thinking skills.

The results of the studies mentioned here have supported the widely accepted belief that postsecondary education is correlated with increased critical thinking abilities. Girot (2000) found opposing results among nursing students and nurses, noting that there were no differences in critical thinking abilities among first-year undergraduate students, senior undergraduate students, graduate students, and nongraduate practitioners, as measured by the WGCTA. King et al. (1990) found differences in critical thinking abilities based upon the academic discipline of traditional college students: Mathematical students performed higher on critical thinking tests than social science students did. King et al. expected to find this result because certain disciplines focus more on teaching critical thinking skills than others do. King et al. also found differences in critical thinking abilities between undergraduate and graduate students on three critical thinking tests. However, when aptitude ability was controlled, significance was found for the RJI only. King et al. suggested that the significant difference between education levels and critical thinking ability may be that of academic ability.

Interpretation of the Literature

In general, the studies reviewed in this chapter identified a relationship between depression and individuals' deficits in their ability to solve social problems, as well as their reduced ability to reason (Anderson, Goddard, & Powell, 2011; Baker & Channon, 1995; D'Zurilla et al., 1998; Krantz & Hammen, 1979; Nezu, 1986, 1987). Literature about the symptomatology of depression and cognition has shown that individuals who manifest symptoms of depression have some deficits in social problem-solving skills, whether it is in the creation of hypotheses or alternative solutions to social problems or in

the attitude with which they approach solving hypothetical social problems (D'Zurilla et al., 1998; Gotlib & Asarnow, 1979; Haugh, 2006; Nezu, 1986). In addition, some researchers have supported the idea that critical thinking is the result or byproduct of educational experience and that critical thinking skills increase with educational experience (Dunwoody et al., 2013; King et al., 1990; Shin et al., 2006).

The results discussed in this chapter of the dissertation were relevant to the study because they suggested that people with depressive symptoms also might have some level of deficit to think critically by deliberately engaging in reasoning about their personal problems or conclusions formed about events or experiences that lead to their emotional distress. The results of the studies discussed in the literature review supported the contention that although a relationship exists between thinking and the symptomatology of depression, researchers still have not fully explored the relationship between the symptomatology of depression and critical thinking.

Summary

Included in this chapter is a discussion of literature about the relationship between the symptomatology of depression and diminished thinking. Hartmann (1958) and Jahoda (1958) suggested that the ways in which people respond to and cope with personal problems can be correlated with depressive symptoms. The review of literature discussed in this chapter of the dissertation has corroborated that the ways in which people with symptoms of mental illness think about hypothetical and personal problems might be different from those of people without them (See Marx et al., 1992; Platt et al., 1975). The studies reviewed in this chapter has also identified some level of relationship

between depression and the cognitive errors that according to Beck (1967), people with depression tend to exhibit (See Krantz and Hammen, 1979; White, Davison, Haaga, & White, 1992). Researchers such as Anderson, Goddard, and Powell (2011), Channon and Baker (1994), and Haaga, Fine, Terrill, Stewart, and Beck (1995) have shown mixed results between the symptomatology of depression and social problem solving or cognitive deficits. Although substantial empirical research has demonstrated that a relationship exists between depression and thinking, some areas remain underexplored.

The studies discussed in this chapter have not determined whether a deficit in critical thinking, a skill essential for solving a variety of social and personal problems, is a factor that accounts for deficits in cognitive skills. Chapter 3 includes an explanation of the methodology as well as information about the sample and target population, data collection instruments, and the data collection and analysis processes. Ethical issues and research questions also are discussed.

Chapter 3: Research Methodology

The purpose of this quantitative study was to investigate some assumptions from Beck's theory of cognition, specifically how the cognition of people with depression and their inability to apply reasoning effectively are related to negative thoughts about themselves, events, or experiences that can cause emotional distress. Beck (1967) suggested that negative cognitions are dysfunctional because they fuel negative emotions and behavioral responses that can keep people with depression from reasoning objectively about their negative thoughts.

According to Beck et al. (1979), the more severe the level of depression that people experience, the more likely they are preoccupied and overcome with negative self-statements such as, "I am incompetent." Negative self-statements represent cognitive errors, a primary characteristic of the cognition of people with depression (Beck, 1967). Based upon Beck's supposition, the assumption can be made that deficits in effective everyday reasoning is troubling for people with symptoms of depression. To analyze Beck's theory of cognition more closely, this researcher examined deficits in the cognition of people with depression by analyzing their critical thinking abilities and desire to engage in effortful thought, think abstractly, and address complex problems in everyday life. This researcher used the Ennis-Weir Critical Thinking Essay test to assess for core critical thinking abilities and the NCS-SF to assess the participants' willingness to engage in ambiguous information and to think abstractly and to address social problems.

This chapter includes a description of the research design as well as information about the target population, the setting and sample, the sampling method, the sample size, and the participation criteria. The chapter contains information about the assessments, rationale, and purpose for using the instruments, as well as how this researcher interpreted the assessment scores. It also explains the data collection procedure, the issues related to threats to the study, and the ways in which this researcher addressed these issues. The chapter closes with an explanation of the ethical considerations that were used to protect the volunteer participants.

This researcher conducted a quantitative study to determine whether interactions existed between the IVs of symptoms of depression and education level and the DVs of critical thinking skills and the need for cognition using the NCS-SF. To address the research questions and test the hypotheses, the IV of symptoms of depression was based upon the participants' scores on the SDS, and total scores were separated into two categories (no symptoms of depression and symptoms of depression). This researcher used a cutoff score of $< .43$ and $\geq .50$ that was based on Zung's cutoff scores indicating the presence of clinical depression. The Ennis-Weir Critical Thinking Essay test was used to assess for core critical thinking skills. Two-way between subject ANOVA tests were used to compare the main effect of scores between no symptoms of depression and symptoms of depression and two levels of education on critical thinking skills and need-for-cognition scores. The two-way ANOVA tests also helped this researcher to determine whether there was an interaction between the IVs of depression and education and the DVs of critical thinking skills and need for cognition. By analyzing for main effects and

interactions, the ANOVA tests allowed this researcher to make inferences from the results about a possible relationship between the symptoms of depression and critical thinking skills and the desire of individuals to structure ambiguous information in more meaningful ways.

Methodology

Population

Undergraduate and graduate students attending traditional and online postsecondary institutions comprised the target population. The participants reported having mild to severe symptoms of depression, and others had no symptoms of depression based on the SDS. Seventy-five participants volunteered for the study.

Sampling

This researcher used a convenience sample comprised of students who manifested some depressive characteristics as well as students who did not. Participation was open to males and females in undergraduate and graduate postsecondary degree programs. Individuals were eligible to participate in the study based upon five criteria:

- They were undergraduate or graduate postsecondary students.
- They were 18 years of age or older.
- They had not been placed in an honors English class or had not taken an advanced English class in high school.
- They were able to read and speak English fluently.
- They reside in the United States or Canada.

A priori sample size determination was conducted using G*Power v3.2.1. This researcher concluded that a sample of 75 participants had sufficient power (.80) to determine whether a significant relationship existed ($\alpha = .05$ with η^2 effect size = .4).

Data Collection

Once approval from participating University's Institutional Review Board (IRB) to conduct the study was obtained (IRB approval #12-10-14-0041327), this researcher began the recruiting process through online venues. The data collection process took a total of 3 years and 6 months. The length of the data collection phase was primarily due to this researchers' inability to reach participants who would volunteer for the study. Due to this complication, this researcher changed the data collection design multiple times (see Appendix E). The first data collection resulted in no participants volunteering for the study. The second data collection resulted in SurveyMonkey.com closing the collection process due to a high number of dropouts. The third data collection was found to have an erroneous survey question concerning the critical thinking variable of the study. The final data collection was collected through SurveyMonkey, and the participants completed the SDS, the NCS-SF, the Ennis-Weir Critical Thinking Essay test, and the demographic questions (see Appendix A). The data from the final data collection were analyzed for this study.

This researcher chose specific websites that would allow the study to target college students experiencing symptoms of depression, including the participating university's participant pool, www.FindParticipants.com, www.WeSearchTogether.org, and the Hanover College Psychology Department's online research website that is made

available to researchers and participants outside the educational institution. Price (2012) suggested that researchers can recruit participants through a university's research pool, and that participants who are not members of the pool can be recruited through advertising and posting notices to groups that represent the study population. Using multiple online sources to solicit participants from widened the demographics of the sample size.

According to the American Psychological Association (2010b), researchers should collect demographic information so that important generalizations and comparisons can be made and information can be used for secondary data analysis. The volunteers who signed the informed consent form electronically and completed the SDS and the NCS-SF comprised the sample. This researcher acknowledges that there may be demographic variations between users of the online websites, such as age, gender, college level, socioeconomic status, but there were no significant differences in academic performance or critical thinking skills among the college students who access the study through different online means. Fredda (2000) found no significant differences between undergraduate and graduate students regarding course completion grade. Jaggars and Bailey (2010) suggested that that overall there are no significant differences among college students' academic performance between online and face-to-face student. Derwin (2009) found that critical thinking skills between distant and online students and face-to-face students showed no significant differences when using the California Critical Thinking Skills test (CCTST). This researcher did not analyze the data pertaining to critical thinking performance between the online and face-to-face students in this study.

Instrumentation and Materials

This researcher used three instruments to identify a relationship between critical thinking skills, the need for cognition, and the symptomatology of depression. The NCS-SF measured the desire to engage in effortful thought and to think abstractly and address complex problems. The Ennis-Weir Critical Thinking Essay test measured critical thinking skills. The SDS measured symptoms of depression. The instruments were made available to the participants through SurveyMonkey's (2013) website.

Zung Self-Rating Depression Scale. The SDS was developed by Zung in 1965 to assess for the presence of symptoms of depression in patients with depression. The SDS is a self-administered instrument available to patients admitted to a psychiatric service. Researchers have considered the SDS a reliable instrument to assess for symptoms of depression (Olukayode, 1976; Shafer, 2006; Zung 1965). Olukayode (1976) found that the SDS had an internal consistency reliability coefficient of .75 with a sample of patients with substance use addicts as well as a group of university students.

Zung (1973) suggested that validity of the SDS is represented by expert opinions confirming that the questions on the instrument represent symptoms of depression and that total scores on the instrument can identify patients with symptoms of depression. The SDS (Zung, 1965) has been correlated with other depression rating scales, including the HDI, the BDI, and the Depression Adjective Checklist. The SDS also has shown validity in cross-cultural studies (Zung, 1973). Zung and King (1983) found that the SDS was an acceptable screening tool in a general medical practice setting to uncover masked

depression. Zung (1973, 1986) also reported a split-half correlation of $r = .73$ and later reported internal consistency with an alpha coefficient reliability of .92. The SDS was used to identify levels of depression. This researcher received permission to use this instrument (see Appendix B).

The SDS (Zung, 1965) is a 20-item scale comprising the most common characteristics of depression. Ten of the survey items are worded symptomatically positive, and 10 are worded symptomatically negative. The instrument uses a 4-point Likert-type scale of responses: 1 (*none or a little of the time*), 2 (*some of the time*), *3* (*good part of the time*), and 4 (*all or most of the time*). Items on the SDS are related to individuals' moods; thoughts about themselves and their futures; and changes in sleep, weight, sexual desire, fatigue, and other psychological changes. The students should be able to complete the instrument in approximately 2 minutes.

This researcher used the SDS (Zung, 1965) to identify symptoms of depression. Zung showed that the cutoff score for a clinical diagnostic based on the most commonly found characteristics of depression is < .49. Scores $\leq$ .50 and higher represent clinically significant symptoms, the severity of symptoms range from mild (.50 - .59) to moderate to severe ($\geq$ .60). Zung considers the mean score of those with lesser severity depression to be 54. Zung and King (1983) examined the SDS and found that 60% of 499 patients scored an index of .55 or greater on the SDS that indicated the presence of clinically significant depressive symptoms and met the *DSM* (3rd ed., APA, 1980) diagnostic criteria for major depressive disorder (MDD). Mild symptoms and moderate-to-severe symptoms compiled the group with clinical symptoms of depression for this study. This

researcher used ≥ .50 and greater as the cutoff score on the SDS to indicate clinically significant symptoms of depression and ≤ .43 to indicate no presence of clinical symptoms of depression.

Need for Cognition Scale-Short Form. In 1955, A. R. Cohen et al. conducted a study to measure individuals' levels of frustration with ambiguous information. Based upon those results, Cacioppo and Petty (1982) developed the NCS, a 34-item scale, to measure individuals' general desire to enjoy thinking by having faculty and students at the participating university complete a series of test. This instrument measures is the level of predictability that individuals like to engage in effortful thinking, think abstractly, and address complex problems (Cacioppo et al., 1984). This researcher received permission to use the NCS-SF for this study (see Appendix C).

The NCS measures three dimensions: enjoyment of cognitive stimulation, desire for understanding, and preference for complexity (K. R. Lord & Putrevu, 2006). The NCS-SF has 18 items that require responses based upon a 9-point Likert-type scale: +4 (*very strong agreement*), +3 (*strong agreement*), +2 (*moderate agreement*), +1 (*slight agreement*), 0 (*neither agreement or disagreement*), -1 (*slight disagreement*), -2 (*moderate disagreement*), -3 (*strong disagreement*), and -4 (*very strong disagreement*). Half of the 18 items are worded positively and half are worded negatively; the scores of some questions are reversed. The test takes approximately 2 to 5 minutes to complete.

According to A. R. Cohen et al. (1955), individuals need to make sense of their world. The NCS-SF helps to measure the extent to which individuals gather information, reason, and address problems to cope with daily predicaments. The instrument asks such

questions as whether the individual would prefer to think about complex problems rather than simple ones or whether the individual would rather do something that requires little thought compared to something that would challenge the individual's thinking abilities (Cacioppo et al., 1984). Low scores suggest the desire to seek less information, engage less in thinking, and rely more on cognitive heuristics or social comparisons to make sense of the world (Cacioppo & Petty, 1982; Cacioppo, Petty, Feinstein, & Jarvis, 1996; A. R. Cohen et al., 1955). A high score suggests the desire to apply effort to understand and evaluate information and to engage in analytic thinking and reflective thinking to make sense of relationships and ambiguous situations.

The 34-item NCS shows high internal consistency and is reliable for measuring an individual's desire to exert effort into thinking, with reliability scores ranging from .76 to .91 (Cacioppo et al., 1996). Cacioppo and Petty (1982) reported an internal consistency of .87. Content validity was established by using an extensive participant pool of university students and an alpha coefficient of .91 (Cacioppo et al., 1984). The NCS-SF was developed by ranking the NCS's original 34 items by their loading factors. The 18-item NCS-SF has a reliability theta coefficient of .90 and correlates high with the original 34-item NCS ($r = .95$, $p < .001$; Cacioppo et al., 1984).

Ennis-Weir Critical Thinking Essay Test. Ennis and Weir developed the Ennis-Weir Critical Thinking Essay test (1985). The essay test presents a hypothetical situation of a common problem of banning overnight parking on city streets. The test taker is asked to write his or her appraise of and formulate reasons of the eight arguments and a final evaluation of the overall letter as if writing a letter to the editor of a fictional newspaper

(Ennis & Weir, 1985). The arguments provide the test taker with the opportunity to display competence in areas of critical thinking in an essay form (Ennis & Weir, 1985).

Essay critical thinking tests are considered reliable tests for assessing critical thinking skills (Norris & Ennis, 1989). A critical thinking test that has multiple-choice questions can help the grader identify weak critical thinking abilities (Norris & Ennis), 1989). However, Norris and Ennis suggested that multiple-choice critical thinking tests have the limitation of assessing how the test taker arrived at a conclusion and how conclusions were reasoned because forced answers provide already formed conclusions. Essay questions are particularly suitable for evaluating more than one critical thinking skill when an individual is working on a problem, but they can be less useful test than multiple-choice questions when trying to determine which particular critical thinking skill in which the test taker is proficient (Norris & Ennis, 1989). According to the Council for Aid to Education ([CAE], 2015), open-ended questions on critical thinking tests should measure how test takers formulate conclusions and recognize fallacious reasoning and incorrect assumptions. This researcher received permission to use the Ennis-Weir Critical Thinking Essay for this study (see Appendix D).

The Ennis-Weir Critical Thinking Essay test (Ennis & Weir, 1985) is suitable for college level students. Test takers are asked to explain if the eight arguments are strong or weak and to describe any of his or her reasoning for making the argument. A weak argument, for example, is that overnight parking on the streets should not be permitted because parking on the streets is much like having a garage on the streets. A second argument states that parking on the street should be prohibited between 2 a.m. to 6 a.m.

because it would other streets with prohibited parking see few car accidents. The total score describes the test taker's overall strength in critical thinking. The higher the score, the more proficient the test taker is with the critical thinking skills that the test assesses. The test scores range from -9 to 29. Each of the eight arguments ranging from -1 to +3 and the ninth argument has a scoring range between -1 to 5 (Ennis & Weir, 1985). Each of the eight paragraphs represents at least one of the following critical thinking errors or types of reasoning:

- Getting to the point.
- Recognizing reasons and assumptions.
- Recognizing other possibilities and/or explanations.
- Avoiding making overgeneralization, not recognizing credible problems or use of emotive language and persuasion.
- Not recognizing excessive skepticism, irrelevant statements, and/or equivocation.
- Misrepresenting an argument.
- Identifying when an argument is not proven. (Ennis & Weir, 1985).

The test does not assess for other critical thinking skills such as deductive reasoning (Ennis & Weir, 1985). An extensive explanation of the scoring protocol is provided by the test manual. Points are awarded for calling the argument weak or strong and for making sound judgments about the arguments and the letter (Ennis & Weir, 1985). Ennis and Weir (1985) expressed the importance of the grader using his or her own judgment when interpreting responses and when considering whether the test taker's

responses meet the grading criteria outlined in the test manual's grading rubric. Ennis and Weir caution graders not to judge the test-taker's writing ability, to consider the test taker's use of jargon and if the terms are used in a way that it is relevant to the problem, and to give credit if the test-taker understood a particular problem but was not able to express himself or herself more clearly.

Ennis and Weir (1985) reported interrater reliability coefficients of .86 and .82. The test's content validity is based on the problems presented that are common aspects of critical thinking (Ennis & Weir). The eight aspects of critical thinking grading rubric of the Weir Critical Thinking Essay Test (Ennis & Weir, 1985) include:

- Noticing misuses of analogy and/or shift in meaning.
- Recognizing irrelevant reasoning.
- Recognizing relevant reasoning.
- Recognizing circularity and/or the lack of a reasoning.
- Recognizing other possibilities.
- Recognizing insufficient sampling and/or other possible explanations.
- Recognizing equivocation and/or the use of an arbitrary definition.
- Evaluating persuasion of talk, error in conclusions, and/or irrelevant information. (Ennis & Weir, 1985).

Research Questions and Hypotheses

This researcher designed the data collection strategy to answer the research questions, which helped to identify whether there were differences between the IVs of levels of depression (no symptoms of depression, mild-to-moderate symptoms of

depression, and moderate-to-severe symptoms of depression) and education and the DVs of critical thinking skills and need for cognition.

RQ1: Is there a difference in critical thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression?

H_{01}: There are no significant differences in critical-thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression.

H_{a1}: There are significant differences in in critical thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression.

RQ2: Is there a difference in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university undergraduate and graduate students?

H_{02}: There are no significant differences in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university students (undergraduate and graduate) who have no symptoms of depression and mild-to-severe symptoms of depression.

H_{a2}: There are significant differences in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university students (undergraduate and graduate) who have no symptoms of depression and mild-to-severe symptoms of depression.

RQ3: Is there an interaction between depression levels (no symptoms of depression and mild to severe symptoms of depression) and educational level (undergraduate and graduate) as they relate to critical thinking in university students, as measured by the Ennis-Weir Critical Thinking Essay test?

H_{03}: There is no interaction between the effects of depression levels (no symptoms of depression and mild-to-severe symptoms of depression) and educational level (undergraduate and graduate), as they relate to critical thinking skills in college students.

H_{a3}: There is an interaction between depression levels (no symptoms of depression and mild-to-severe symptoms of depression and educational level (undergraduate and graduate) as they relate to critical thinking skills in college students.

RQ4: Is there a difference in need-for-cognition scores, as measured by the NCS-SF, between college students who have no symptoms of depression and mild-to-severe symptoms of depression?

H_{04}: There is no significant difference in need-for-cognition scores, as measured by the NCS-SF, among undergraduate and graduate students with no symptoms of depression and mild-to-severe symptoms of depression.

H_{a4}: There is a significant difference in need for cognition scores, as measured by the NCS-SF, between undergraduate and graduate students with no symptoms of depression and mild-to-severe symptoms of depression.

RQ5: Is there a difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students?

H_{05}: There is no significant difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students, .

H_{a5}: There is a significant difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students.

RQ6: Is there an interaction between depression levels and educational levels as they relate to need for cognition in college students, as measured by the NCS-SF?

H_{a6}: There is no interaction between the effects of depression (no symptoms and mild-to-severe symptoms of depression) and educational levels (undergraduate and graduate) as they relate to need for cognition in postsecondary students, as measured by the NCS-SF.

H_{a6}: There is an interaction between the effects of depression (no symptoms and mild to severe symptoms of depression) and educational levels (undergraduate and graduate) as they relate to need for cognition in postsecondary students, as measured by the NCS-SF.

Data Analysis

After downloading the responses to the SDS and the NCS-SF from SurveyMonkey's website, this researcher calculated the total scores and entered the data into SPSS v.20. The frequencies were run to check for missing data, outliers, or other anomalies, assumptions, and then analyzed the data using two-way ANOVAs. This researcher ran a two-way ANOVA to analyze for and interaction and main effects between groups on the IVs of depression and education level and the DVs of critical

thinking skills. A second two-way ANOVA was run to analyze for an interaction and main effects between groups on the IVs of depression and education level and the DVs of need for cognition. All tests used $\alpha = .05$ as the criterion for failing to reject or failing to accept each null hypothesis.

Issues About Validity

Potential problems concerning the validity of the study might affect the statistical conclusions. Individual intelligence presented a possible confounding factor in the current study. Potential participants with high levels of intelligence who also had symptoms of depression might have been able to perform better on a critical thinking exam than individuals with less intelligence, regardless of level of depression. This issue, if not controlled for, could have inflated reported critical thinking skills. To address these issues, this researcher excluded students who had been in an honors English class or who had taken an advanced English class in high school because vocabulary scores could have been a reliable indicator of general intelligence (Groth-Marnat, 2009).

This researcher assumed that the participants would meet the eligibility criteria and answer the survey items on the instruments truthfully. This researcher promoted this effort by ensuring the participants of their anonymity and the confidentiality of their data. The participants were advised that they could withdraw from the study at any time without any repercussions.

King, Wood, and Mines (1990) found differences in critical thinking abilities based upon the academic discipline of traditional college students: Mathematical students performed higher on critical thinking tests than social science students did. In addition,

when King et al. removed the effects of academic aptitude, the only significant difference was on the RJI. Although there may be differences in critical thinking abilities across specific areas of study, King et al did not factor in the participants' discipline or academic aptitude when computing critical thinking scores.

Anderson, Goddard, and Powell (2009) found that students with no symptoms of depression were able to solve hypothetical social problem-solving skills but less able to solve real personal problems. If there are differences to the ability apply critical thinking skills to personal or social situations, information, or problems compared to reactions to hypothetical scenarios, this study did not identify that relationship.

Limitations

There were some limitations to the study. The principal limitation of this study was that this researcher identified depression only on the basis of the participants' self-reported symptoms on the SDS (Zung, 1965) without confirmation based upon a structured interview by a mental health professional, as is normally required for a definitive diagnosis. Some researchers have suggested that self-reporting measures of depression may not sufficiently differentiate symptoms that indicate depression from that of other psychological states such as anxiety symptoms (Tanaka-Matsumi & Kameoka, 1986). To examine the validity of self-reporting depression inventories, Tanaka-Matsumi and Kameoka (1986) ran tests to correlate depression with anxiety self-rating instruments, including the SDS; the BDI; the Lubin Depression Adjective Checklist; the State and Trait forms of the Spielberger Anxiety inventory; the Taylor Manifest Anxiety scale; and Endler, Hunt, and Rosenstein's S-R Inventory of Anxiousness. The results

supported Tanaka-Matsumi and Kameoka's contention that self-reporting depression instruments might be problematic in identifying mild or nonclinical symptoms of depression in college students because of the overlapping symptoms of the two disorders. This researcher did not determine whether scores of depression on the SDS indicating symptoms of depression could have been accounted for by another psychological state such as anxiety.

Another limitation with self-reporting was noted by Marks and Yardley (2004), who argued that these types of measurements often require the reporting individuals to relate the questions to their subjective experiences, which might result in biased answers that the interviewer or the researcher has little control over. If study participants are not truthful when completing a self-report instrument, test results can be biased (Haworth, 2001). The underreporting of depressive symptoms or false subjective perceptions about behavior could result in biased data that could decrease the probability of finding statistically significant associations between the experience of depression and cognitive functioning.

Protection of Participants

This researcher provided a consent form to all participants that they were required to sign prior to joining the study. The form contained the following information: (a) the researcher's responsibility to maintain their privacy and the confidentiality of their responses, (b) the expected time to complete the study, (c) the right to decline to participate or withdraw from the study at any time, (d) any foreseeable risks or consequences of declining to participate or withdrawing from the study, (e) whom to

contact with questions or concerns about the study, (f) any direct benefit from participating in the study and any compensation, and (f) the opportunity to ask questions and receive answers about the study (American Psychological Association, 2010a).

Confidentiality

This researcher will keep all signed consents in a secure, password-protected file for 5 years, after which time the files will be destroyed. This protocol is in compliance with the American Psychological Association's (2010b) ethical requirements. SurveyMonkey's website contains firewalls that restrict access to their ports. The website has an intrusion detection and instruction prevention as well as a patch to the operating systems when any newly discovered vulnerabilities are detected (SurveyMonkey, 2014). Once the data were collected and analyzed, this researcher deleted the data from the SurveyMonkey website and kept all the material on a password-protected flash drive.

Debriefing

In compliance with the American Psychological Association's (2010b) code of ethics, this researcher provided all participants who completed all the assessments, as well as any participants who chose to withdraw early from the study, with a debriefing form. The primary goal of debriefing was to ensure that the participants did not experience further stress or discomfort resulting from their participation in this study. This researcher was not informed by any participants of any harm from being in this study.

The debriefing, which took place after the study was finished on www.SurveyMonkey.com, was in writing. The participants were made aware of the

nature of the study and how they could obtain the results. This researcher reminded the participants of their right to confidentiality and provided them with a list of mental health specialists who could provide any necessary mental health services (American Psychological Association, 2010b). The participants were informed that the results of the study would benefit society by increasing current knowledge about depression (Citro, Ilgen, & Marrett, 2003). This researcher gave the participants the opportunity to contact the researcher with any questions about their involvement in the study. The debriefing form included a thank you to the participants for their time.

Summary

This empirical study was designed to compare the DV's of critical thinking skills and the need for cognition with the IVs of symptoms of depression and level of education among a sample of postsecondary undergraduate and graduate students with no symptoms of depression and mild to severe symptoms of depression. A sample of 52 was deemed an appropriate sample size for this study and a total of 75 responses was collected. The participants were obtained through the participating university's participant pool, www.FindParticipants.com, www.WeSearchTogether.org, and Hanover College Psychology Department's online research website. The SDS and the NCS-SF were administered electronically through www.SurveyMonkey.com. This researcher used the SDS to identify levels of symptoms of depression and the NCS-SF to identify the need for cognition. The Ennis-Weir Critical Thinking Essay test was used to determine critical thinking abilities. The data collection process included the debriefing of all

participants. This researcher used SPSS v.20 to analyze the data and test the hypotheses. Chapter 4 provides the results of the ANOVAs that tested the hypotheses.

Chapter 4: Results

The purpose of this quantitative study was to investigate some assumptions in Beck's theory of negative cognition about depressed people's faulty ability to apply effortful reasoning to their negative thoughts in relation to the symptomatology of depression. Beck (2008) suggested that depressive symptoms occur when negative thoughts or beliefs take over information processing so that information about experiences or events is perceived in negative and erroneous ways. To investigate the assumptions about the failure of people with depression to apply reasoning to negative thinking, this researcher examined the relationship between the symptomatology of depression and critical thinking skills among postsecondary students and the need for cognition. Six research questions guided the analysis of the data.

Research Questions and Hypotheses

RQ1: Is there a difference in critical thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression?

H_{01}: There are no significant differences in critical-thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression.

H_{a1}: There are significant differences in in critical thinking scores as measured by the Ennis-Weir Critical Thinking Essay test between college students who have no symptoms of depression and mild-to-severe symptoms of depression.

RQ2: Is there a difference in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university undergraduate and graduate students?

H_{02}: There are no significant differences in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university students (undergraduate and graduate) who have no symptoms of depression and mild-to-severe symptoms of depression.

H_{a2}: There are significant differences in critical thinking scores, as measured by the Ennis-Weir Critical Thinking Essay test, between university students (undergraduate and graduate) who have no symptoms of depression and mild-to-severe symptoms of depression.

RQ3: Is there an interaction between depression levels (no symptoms of depression and mild to severe symptoms of depression) and educational level (undergraduate and graduate) as they relate to critical thinking in university students, as measured by the Ennis-Weir Critical Thinking Essay test?

H_{03}: There is no interaction between the effects of depression levels (no symptoms of depression and mild-to-severe symptoms of depression) and educational level (undergraduate and graduate), as they relate to critical thinking skills in college students.

H_{a3}: There is an interaction between depression levels (no symptoms of depression and mild-to-severe symptoms of depression and educational level (undergraduate and graduate) as they relate to critical thinking skills in college students.

RQ4: Is there a difference in need-for-cognition scores, as measured by the NCS-SF, between college students who have no symptoms of depression and mild-to-severe symptoms of depression?

H_{04}: There is no significant difference in need-for-cognition scores, as measured by the NCS-SF, among undergraduate and graduate students with no symptoms of depression and mild-to-severe symptoms of depression.

H_{a4}: There is a significant difference in need for cognition scores, as measured by the NCS-SF, between undergraduate and graduate students with no symptoms of depression and mild-to-severe symptoms of depression.

RQ5: Is there a difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students?

H_{05}: There is no significant difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students, .

H_{a5}: There is a significant difference in need-for-cognition scores, as measured by the NCS-SF, between undergraduate and graduate college students.

RQ6: Is there an interaction between depression levels and educational levels as they relate to need for cognition in college students, as measured by the NCS-SF?

H_{a6}: There is no interaction between the effects of depression (no symptoms and mild-to-severe symptoms of depression) and educational levels (undergraduate and graduate) as they relate to need for cognition in postsecondary students, as measured by the NCS-SF.

H_{a6}: There is an interaction between the effects of depression (no symptoms and mild to severe symptoms of depression) and educational levels (undergraduate and graduate) as they relate to need for cognition in postsecondary students, as measured by the NCS-SF.

Data Collection

The sample comprised of 75 undergraduate and graduate postsecondary students who this researcher recruited through the participating university's participant pool, www.FindParticipants.com, www.WeSearchTogether.org, and Hanover College Psychology Department's online research website. The data were collected from the participants' scores on the NCS-SF (Cacioppo et al., 1984); their scores on the SDS (Zung, 1965); their scores on the Ennis-Weir Critical Thinking Essay test (Ennis & Weir, 1985), and their education levels. This data collection took 14 months. Previous data collections were attempted, and the data collection went through a series of approved changes (see Appendix E). The IV level of depression was measured by the SDS (Zung, 1965). This researcher scored the total SDS scores and placed them into two categories: No symptoms of depression ($\leq .43$) and mild to severe ($\geq .50$). The tests were hand scored, a protocol that adhered to the guidelines established by Zung. All of the instruments and demographic questions were completed by the participants using www.SurveyMonkey.com (2013). The participants who responded also provided demographic information about their gender, how they accessed the study, status as a traditional or online student, race, and age.

Demographic Results for the Sample

Table 1 shows the number of participants and percentage for undergraduate and graduate students with reported level of depression. The American College Health Association (]ACHA]; 2009) reported that 14.9% of college students who were surveyed reported having received a diagnosis of depression. Of that number of students, 32% reported a diagnosis during the past school year, and 24% reported currently receiving therapy for depression. Although the rate of depression in this sample compared to the general population with depression is unknown, 38 of the 75 participants' scores in this study reported symptoms that suggest clinical depression by the SDS.

Table 1

Reported Levels of Depression and Characteristics (Gender, Ethnicity, Student Type, and age) of Participants

Characteristics		
Undergraduate	30	40
Depression	17	23
No Depression	13	17
Graduate	45	60
Depression	21	28
No Depression	24	32
Gender		
Female	56	75
Male	19	25
Ethnicity		
White/Caucasian	51	68
Hispanic American/Latino American	5	7
Black American/African American	11	15
Asian American or Pacific Islander American	5	17
Other	3	4
Student Type		
Online	45	60
Traditional (Brick & Mortar)	18	24

(table continued)

Age		
18-29	23	31
30-44	18	24
45-59	28	37
60 +	6	8

Note. $N = 75$

Hypothesis Testing and Results

Laerd Research (2013) suggested that researchers should test assumptions of normality and equal variances prior to conducting data analysis. To ensure the accuracy of the demographic statistics, this researcher used SPSS v.20 to perform a missing value screening prior to analyzing the data. A frequency analysis identified no missing values for the IVs of level of depression, level of education, and no missing values for the DVs of critical thinking skills scores and need for cognition.

DV Critical Thinking

This researcher analyzed the histograms for the DV of critical thinking for a symmetric bell curve and found that a visual analysis suggests normality is a reasonable assumption. The normal distribution was further analyzed for outliers. According to Laerd Research (2013), outliers are based on box-lengths being greater than 1.5 from the edge of the box in a boxplot. No outliers were identified based on being greater than 1.5 box-lengths from the edge of the box in a boxplot. There was homogeneity of variances, as assessed by Levene's test for equality of variances, $p = .072$ for the variable of critical thinking. To further test for normal distribution of the scores of critical thinking, this researcher used SPSS v. 20 to conduct a Shapiro-Wilk's test (Shapiro & Francia, 1972). The results of the Shapiro-Wilk's test showed that the DV of critical thinking did not

depart from a normal distribution for undergraduate level with no symptoms of depression (df = 13, p = .827) and undergraduate with symptoms of depression (df = 17, p = .667), graduate level with no symptoms of depression (df = 25, p =.10), and graduate with symptoms of depression (df = 21, p = .426).

DV Need for Cognition

This researcher analyzed the histograms for the DV of need for cognition for a symmetric bell curve and found that a visual analysis suggests normality is a reasonable assumption. To test for homogeneity of variances, SPSS Statistics v.20 was used to determine if there are equal variances for the dependent variables of need for cognition. There was homogeneity of variances, as assessed by Levene's test for equality of variances, p = .198 for the variable of need for cognition.

This researcher examined the data for outliers by examining boxplots. Two extreme data points, outliers, were in the data for the DV of need for cognition. These outliers were more than 1.5 box-lengths from the edge of their box, which is classified by SPSS Statistics (IBM, n.d.) as an outlier. Because the data for the IV depression level and education level and the DV of need for cognition had two violations, Laerd Research (2013) suggested as an option to remove the outliers as a method of handling such data so that the data with and without outliers can be analyzed for differences. The outliers were removed from the data set, and a two-way ANOVA was conducted so that a comparison of the results of the two-way ANOVA with and without the outliers could be made. The results were analyzed to see if there are sufficient differences and different conclusions could be drawn from the data, as suggested by Laerd Research. The next section

discusses the testing of assumptions and a reanalysis of the data for hypotheses 4, 5, and 6.

Analysis and Results of Data with Outliers Removed

Test of Assumptions with Outliers Removed

Prior to running an analysis on the data with the removed outliers, this researcher analyzed the histograms for all variables for a symmetric bell curve and found that a visual analysis suggests normality is a reasonable assumption. To test for homogeneity of variances, SPSS Statistics v.20 was used to determine if there are equal variances for the dependent variables of need for cognition. There was homogeneity of variances, as assessed by Levene's test for equality of variances, $p = .418$ for the DV variable of need for cognition. The normal distribution was further analyzed for outliers. No outliers were identified based on being greater than 1.5 box-lengths from the edge of the box in a boxplot. To further test for normal distribution of the scores of Need for Cognition, this researcher used SPSS v. 20 to conduct a Shapiro-Wilk's test (Shapiro & Francia, 1972). The results of the Shapiro-Wilk's test showed that the distribution of the DV of need for cognition scores was normally distributed for undergraduates and graduates, ($p > .05$).

Data Results for Hypotheses 4, 5, and 6 With Outliers Removed

A two-factor ANOVA was used to analyze hypotheses 4, 5, and 6 with the outlier removed from the data set. This researcher removed the data so that the results could be compared to the results of a two-factor ANOVA with the outliers in the data set. The DV of need for cognition and the IVs of depression levels and education levels were the variables for this analysis.

Hypothesis 4

To examine Research Question 4, the main effect of depression level (depression and not depression) was examined. The main effect of depressions was not significant, $F(1, 75) = 1.801$, $p = .184$, suggesting that no statistical mean differences exists between need for cognition by no depression (M = 24.952, SD = 3.973; 95% CI [17.025, 32.878] compared to depression (M = 17.594, SD 3.777; 95% CI [10.058, 25.130]. According to Levine and Hullett (2002), the eta squared ratio of variance is an estimate of the effect size in the sample. The eta squared ratio may be more reliable than the partial eta square for reporting variance and is consistent with Cohen's *d*. (J. Cohen, 1988). The effect size (eta squared = .052) is considered a medium practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 2.

Hypothesis 5

To examine Research Question 5, the main effect of education level (undergraduate and graduate) was examined. The main effect of education level was significant, $F(1, 75) = 4.696$, $p = .034$, suggesting that statistical mean differences exist between need for cognition scores by undergraduate students (M = 15.333, SD = 4.219; 95% *CI* [6.916, 23.749) compared to graduate students (M = 27.213, SD = 3.501; 95% CI [20.229, 34.197]. The effect size (eta squared = .006) is considered a small practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 2.

Hypothesis 6

To examine Research Question 6, the interaction between education level (undergraduate and graduate) and depression (depression and non depression) was examined. The interaction was not significant, $F(1, 75) = .001$, $p = .981$. The effect size (eta squared = .001) is considered a small practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 2, and the means and standard deviations are displayed in Table 3.

Table 2

ANOVA Summary on Depression Categories, Education Levels, and Need for Cognition

Source	*SS*	*df*	*MS*	*F*	p	η^2
Depression * Education	.301	1	.301	.001	.981	.001
Depression	944.595	1	944.595	1.801	.184	.027
Education	2463.004	1	2463.004	4.696	.034	.001
Error	27.247	71	.470			
Total	760.813	75				
Corrected total	30.124	74				

Note. N = 75
Computed using alpha = .05

Table 3

Mean Need for Cognition Scores by Depression and Education (N = 75)

	Mean	SD	N
Depression Level			
No Depression	24.952	3.973	37
Depression	17.594	3.777	38
Education Level			
Undergraduate	15.333	4.219	30
Graduate	27.213	3.501	45

Note. N = 75
Computed using alpha = .05

Data Results for Hypotheses With Outliers in Data Set

A two-way between analysis of variance was conducted on the influence of two independent variables (depression and education) on critical thinking. Depression included two levels (depression and no depression) and education consisted of two levels (undergraduate and graduate). There was no statistically significant interaction. Hypotheses 1, 2, and 3 refer to a two factor ANOVA where the IVs were depression and education and the DV was critical thinking scores. Hypotheses 4, 5, and 6 refer to a two factor ANOVA where the IVs were depression and education and the DV was need for cognitions scores.

Hypothesis 1

To examine Research Question 1, the main effect of depression level (depression and non depression) was examined. The main effect of depression level was not significant, $F(1, 75) = 3.227$, $p = .077$, suggesting that no statistical mean differences exists between critical thinking scores by no depression (M = 14.90, SD = 1.44; 95% CI 12.025 to 17.773] compared to depression (M = 11.33, SD = 1.37; 95% CI [8.609, 14.055]. The effect size (eta squared = .478) is considered a large practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 4.

Hypothesis 2

To examine Research Question 2, the main effect of education level (undergraduate and graduate) was examined. The main effect of education level was not significant, $F(1, 75) = .292$, $p = .591$, suggesting that no statistical mean differences

exists between critical thinking scores by undergraduate students (M = 12.58, SD = 1.54; 95% CI [9.504, 15654]) compared to graduate students (M = 13.65, SD = 1.25; 95% CI [11.158, 16.146]. The effect size (eta squared = .006) is considered a small practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 4.

Hypothesis 3

To examine Research Question 3, a two-way ANOVA was conducted to assess if an interaction exists on critical thinking scores among college students by education level (undergraduate and graduate) and depression (depression and non depression). The results of the ANOVA were not significant, $F(1, 75) = .196$, $p = .659$, suggesting that no statistical interaction exists on critical thinking by depression and education. The effect size (eta squared = .002) is considered a small practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 4, and the means and standard deviations are displayed in Table 5.

Table 4

ANOVA Summary on Depression Categories, Education Levels, and Critical Thinking

Source	*SS*	*df*	*MS*	*F*	p	η^2
Depression * Education	13.744	1	13.744	.196	.659	.002
Depression	226.176	1	226.176	3.227	.077	.043
Education	20.450	1	20.450	.292	.591	.003
Error	4975.750	71	70.081			
Total	18433.000	75				
Corrected total	5285.680	74				

Note. N = 75
Computed using alpha = .05

Table 5

Mean Critical Thinking Scores by Depression and Education Group (N = 75)

	Mean	SD	N
Depression Level			
No Depression	14.899	1.441	37
Depression	11.342	1.336	38
Education Level			
Undergraduate	12.579	1.542	30
Graduate	13.652	1.251	45

Note. N = 75
Computed using alpha = .05

Hypotheses 4, 5, and 6 refer to a two factor ANOVA where the IVs are depression and education and the DV is need for cognition scores. The ANOVA summary is listed in Table 6.

Hypothesis 4

To examine Research Question 4, the main effect of depression level (depression and non depression) was examined. The main effect of depression level was not significant, $F(1, 75) = 1.425$, $p = .237$, suggesting that no statistical mean differences exists between need for cognition by no depression (M = 23.184, SD = 4.508; 95% CI [14.195, 32.173] compared to depression (M = 15.770, SD = 4.271; 95% CI [7.254, 24.287]. The effect size (eta squared, = .024) is considered a small practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 6.

Hypothesis 5

To examine Research Question 5, the main effect of education level (undergraduate and graduate) was examined. The main effect of education level was not

significant, $F(1, 75) = 1.782$, $p = .186$, suggesting that no statistical mean differences exists between critical thinking scores by undergraduate students (M = 15.333, SD = 4.823; 95% CI [5.715, 24.950] compared to graduate students (M = 23.622, SD = 4.3.912; 95% CI [15.822, 31.422]. The effect size (eta squared = .028) is considered a small practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 6.

Hypothesis 6

To examine Research Question 6, a two-way ANOVA was conducted to assess if an interaction exists on need for cognition among college students by education level (undergraduate and graduate) and depression (depression and non depression). The results of the ANOVA were not significant, $F(1, 75) = .000$, $p = .990$, suggesting that no statistical interaction exists on critical thinking by depression and education. The effect size (eta squared, = .000) is considered a small practical significance based on the comparison of Cohen's *d*. (J. Cohen, 1988) effect size values. The results of the ANOVA are summarized in Table 6, and the means and standard deviations are displayed in Table 7.

Table 6

ANOVA Summary for Depression and Educational Levels for Need for Cognition

Source	*SS*	*df*	MS	*F*	p	η^2
Depression * Education	.099	1	.099	.000	.990	.000
Depression	977.054	1	977.054	1.425	.237	.024
Education	1221.423	1	1221.423	1.782	.186	.028
Error	48672.951	71	685.535			
Total	81923.000	75				

(table continued)

Corrected total	51158.187	74

Note. N = 75
Computed using alpha = .05

Table 7

Mean Need for Cognition Scores by Depression Group and Education Group (n = 75)

	Mean	SD	N
Depression Level			
No Depression	23.184	4.508	37
Depression	15.770	4.271	38
Education Level			
Undergraduate	15.333	4.823	30
Graduate	23.622	3.912	45

Note. N = 75
Computed using alpha = .05

Summary

This chapter provided the results of the two-way ANOVA data analysis to determine the relationship between the IVs of level of depression and level of education and the DVs of critical thinking skills and the need for cognition. The purpose of this study was to examine the relationship between the symptomatology of depression and cognitive skills. The results of the first two-way ANOVA with the outliers removed showed no interaction, but a main effect for the DV need for cognition and the IV education level. The results of the first two-way ANOVA with the outliers showed no interaction or main effects between the variables. For Hypothesis 1, there were no significant differences found between the DV of critical thinking skills between postsecondary students with no symptoms of depression and those with signs of depression. For Hypothesis 2, there were no significant differences found between the DV of critical thinking skills and the IV of level of education (undergraduate or

graduate). For Hypothesis 3, there was no statistical significant interaction between the IV of level of depression and the IV of level of education based upon critical thinking skills. For Hypotheses 4, there were no significant differences found between the DV of need for cognition and the IV of level of depression. For Hypothesis 5, there was no significant differences found between the DV of need for cognition and the IV of level of education (undergraduate or graduate). For Hypothesis 6, there was no statistical significant interaction between the IVs of level of depression and level of education based upon the DV of need for cognition. By removing outliers in the data set, there was statistical differences between the DV of need of cognition and the IV of education level.

Chapter 5 provides a summary of the purpose of the study, an interpretation of the results of the data and some reasons for the findings, including explanations of the limitations of the study. Chapter 5 provides recommendations for further research and some possible implications this study has for positive social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Overview of the Study

Clinical mental disorders affect one in six Americans (Kessler et al., 2005) and are a leading global cause of years lost of a life due to disability (WHO, 2009). There is reason for the field of psychology and society at large to be concerned with the number of people with mental illness. The *DSM* (4th ed., APA, 2000) identified impaired cognition as a diagnostic criterion of major depression. Symptoms of major depression meet clinical significance when the individual experiences distress and/or impairment in functioning in one or more areas: social, occupational, or another important area of one's life (APA, 2000). Of college students, the incidence of depression is as high as 32% (American College Health Association [ACHA], 2009). Over half of college students reported having depressive symptoms that impaired their ability to function normally as they would (Hughes, Sathe, & Spagnola, 2009).

The purpose of this quantitative study was to investigate some Beck's assumptions about the negative cognition of people with depression and their failure to apply reasoning to their negative, self-defeating thoughts. Beck (2008) suggested that depressive symptoms occur when negative thoughts or beliefs take over information processing so that information about experiences or events is perceived in negative and erroneous ways. To study this assumption, this researcher examined the relationship between the symptomatology of depression and the cognitive skill critical thinking and the need for cognition. No statistically significant differences were reported between critical thinking and the levels of depression and education. A statistically significant

difference was reported between need for cognition and levels of education when the outliers were removed from the data sample.

There were six research questions that guided this study, and six hypotheses were tested using two-way ANOVA tests. ANOVA tests were conducted to analyze for interactions and main effects between levels of depression and education and critical thinking skills and need for cognition. This researcher hypothesized that there would be differences between critical thinking skills scores and the desire to think abstractly and confront problem solving among college students based on their reported symptoms of depression.

The participants' levels of depression were based on their responses on the Zung's SDS and the desire to think about ambiguous information, think abstractly, and address social problems was based on their responses on the Need for Cognition scale. The participants' critical thinking skills was assessed using the Ennis-Weir Critical Thinking Essay test. This chapter contains an overview of the nature and purpose of the study as well as key findings. An interpretation of this study is discussed.

Difficulties in cognition, such as concentrating and making decisions, are main characteristics of MDD according to the *DSM* (4^{th} ed., APA, 2000) Although researchers such as Haaga et al. (1995); Holahan and Moos (1986); Kuyken and Brewin (1994), Nezu (1985) have shown that people with depression have difficulty with social problem solving, this researcher did not locate studies about the cognitive skill critical thinking or its relevance to solving social problems in relation to depression. This study can only be generalizable to college and university students.

Interpretation of Findings

The results of this study do not show a statistically significant relationship between critical thinking skills and the symptomatology of depression, except for when the outliers in the data are removed. With outliers removed from the data set, the data results show statistical differences in need for cognition scores between undergraduate and graduate college students, $F(1, 75) = 4.696$, $p = .034$. The mean for graduate students was significantly higher for need for cognition compared to undergraduate students, (M = 15.333, SD = 4.219; 95% *CI* [6.916, 23.749) compared to graduate students (M = 27.213, SD = 3.501; 95% CI [20.229, 34.197]. This finding suggests that graduate students tend to have a higher desire to think about ambiguous information and problem solve compared to undergraduate students.

Beck (2008) suggested that experiencing stressful life events might instruct cognitive structures, or schemas, to become dysfunctional. As a result of dysfunctional cognitive structures, the individual directs negative self-perceptions about the event inward. The individual then develops imbedded dysfunctional cognitive structures that distort reality and create partisan attitudes about oneself, the world, and the future. When certain stimuli or stress later activates the dysfunctional schemas, the negative perception continues to distort one's view of him or herself. The individual fails to disengage from thinking about negative self-defeating thoughts. Instead, the individual commits cognitive errors, such as overgeneralizing, selective abstraction, personalization, and interpretational biases that leads to further self-defeating thoughts. Beck (2008) suggested that repetitive activation of negative schemas leads to more organized schematic

structures that become archetypal of behavioral, emotional, and motivational response that are characteristic of MDD.

According to Beck (2008), when an individual with depression engages in dysfunctional negative thoughts about his or herself, two particular events occur. One, the person with depression is involved in a feedback loop where he or she continually fails to disengage from negative, self-defeating thoughts, and the individual continues to be biased towards positive stimuli that perpetuates symptoms of depression. Two, automatic functions of engrained negative schemas override thought processes, such as reasoning, and as a result, the individual's acceptance of negative thoughts become his or her distorted beliefs about reality (Beck, 2008).

These two factors, the failure to disengage from negative reflection of thoughts and the automatic overriding of thought processes, are important for this study for two particular reasons. First, Jahoda (1958) suggested that a healthy perception of reality is one that is not out of proportion to what really exists. Second, mental health rests on being able to adapt to one's environment by means of mastering social problems. For Jahoda, it is not only the end-product of problem solving that is important, but also that the individual chooses to embark upon the problem-solving process and remain committed to solving it. According to Beck (2008), people with MDD would not challenge their negative thoughts or solve personal problems because the automatic schemas would obstruct them from the negative, self-defeating thoughts that are not representative of reality. A deficiency in the desire to think about ambiguous information may play a role in whether a person decides to engage in critical thinking and to generate

alternative possibilities or solutions to their negative thinking or problems. The results of this study did not support Beck's theories of the hindering effect that negative cognition has on the ability to challenge one's negative thoughts or engage in effortful thinking. The next section of this chapter will explore reasons why this study did not fully support Beck's theories about deficits in reasoning abilities and the symptomatology of depression.

Factors That May Have Influenced the Results

According to Beck et al. (1979), depression is associated with being preoccupied with and overcome by negative self-statements that may impede one's ability to reason logically. The results of this study should have shown that the group of participants with mild-to-severe levels of depression has a significant deficit in the ability to engage in critical thinking because the preoccupation with negative thinking limits one's ability to engage in self-directed reasoning. The results of this study showed that the group of participants with mild-to-severe levels of depression scored lower on critical thinking abilities and the need for cognition compared to group of participants with no symptoms of depression, but the results were not significant. The failure to reach statistical differences between the two groups may be multifaceted and may be due to certain variables, such as gender or age, or the research design, which this researcher will further discuss in the next section. Based on Kumar and James (2015) and King et al.'s (1990) findings, this researcher suggests that the male population in this study was underrepresented and that a more equal representation of males might have yielded different critical thinking scores. King et al. (1990) and Kumar and James (2015) showed

that critical thinking skills are correlated with gender King et al. assessed undergraduate and graduate students, males and females, using three critical thinking instruments: the WGCTA (Watson & Glaswer, 1964), the CCTT (Ennis, 1971), and the RJI (Kitchener & King, 1981). King et al. reported that there were main effects for all three instruments showing that the males scored consistently higher than the females did. Kumar and James (2015) found that when male and female college students were assessed on the Watson-Glaser Critical Thinking model of inferences, assumptions, deductions, interpretation and arguments, that the male students showed higher scores of inference and interpretation skills than the females did, and that the female students showed more argument skills compared to the males. In Kumar and James' study, there were 18 males (24%) and 57 females (76%). Both of the studies mentioned in this section showed that there were differences in critical thinking abilities between men and women. In accord with the finding by King et al. and Kumar and James, it is possible that the unequal gender ratio in this study may have affected the total critical thinking scores because men and women may perform differently on certain critical thinking skills. There was no indication from this study's data that the 19 men and 57 women studied scored differently on critical thinking, $F(1, 75) = .130$, $p = .720$, $\eta_p^2 = .002$, and an observed sample size effect of .065.

A second factor that may or may not have influenced the results of this study is that the population was comprised of participants who self-reported symptoms of depression on the SDS (1965). A common procedure is for clinicians to diagnose patients with major depression by using a combination of a self-reporting depression screening instrument and a structured clinical interview. According to van de Mortel (2008), the

tendency for people to portray themselves in a favorable way on self-reporting questionnaires may impact the studies because self-reporting questionnaires may increase the chance of obtaining biased answers when participants underreport symptoms of depression. This study did use a self-reporting instrument that was not accompanied with any type of technique to help detect whether the participants reporting symptoms of depression were biased or not.

Furthermore, this researcher did not have the participants assessed for clinical depression or confirm MDD with an interview with a licensed clinician. This may or may not have influenced the results of this study because as Levin-Aspenson and Watson (2017) suggested, researchers who do not include a clinical structured interview for depression may not necessarily experience a negative impact on the results of their study. Levin-Aspenson and Watson found that respondents who are younger and higher educated and are sensitive to some questions may report lower rating of depression, based on the Health Questionnaire by Kroenke and Spitzer (2002) and The Inventory for Depression and Anxiety Symptoms (Watson et al., 2007). Cuijpers, Juan, Hofmann, and Andersson (2010) and Rush et al. (2006), however, reported that self-reporting instruments can have an opposite effect where the total score is higher compared to clinician-rated instruments). Rush et al. (2006) reported that the average baseline for clinician rated depression was 2.2 points higher (greater in level of severity) than that of self-reporting instruments.

To help with the issue of under scoring or over scoring the participants' scores on the SDS (1965), this researcher used $\geq$ .50 and greater as the cutoff score on the SDS

(1965) to indicate clinically significant symptoms of depression and $\leq .43$ to indicate no presence of clinical symptoms of depression. The scores between the two cutoff scores were removed from the data set. If respondents tended to report higher ratings on the SDS (1965) instrument, then it is possible that some of the scores on the SDS could have been inadvertently included in the depression category. The inclusion of any biased reported scores may have impacted the category with depression when analyzing this study's data analysis.

A third factor that could have affected the results of this study is that individuals might experience a greater emotional reaction to their own problems compared to that of hearing about another person's situation or about a hypothetical situation (Cavanaugh & Cavanaugh, 2010). D'Zurilla et al. (1998); Haaga et al. (1995); Marx and Schulze (1991), and Marx et al. (1992) reported that people with symptoms of depression showed a greater cognitive impairment in the ability to develop solutions to hypothetical problems compared to participants with no symptoms of depression D'Zurilla and Maydeu-Olivares (1995); D'Zurilla et al. (1998); Haaga et al. (1995); Marx and Schulze (1991), and Marx et al. (1992) have reported mixed findings. The differences in the reported literature may be due to the type of problem task in which researchers used to assess their participants' problem solving abilities. Anderson et al. (2009) found that students with depression could produce effective strategies on the MEPS (hypothetical assessment) but were less effective at attempting to solve their own interpersonal problems. The results of Anderson et al.'s study suggests that students with symptoms of depression have a greater difficulty solving interpersonal problems than solving hypothetical ones.

This study used a critical thinking assessment that consisted of a hypothetical case story where a test-taker is asked to identify statements that contained erroneous reasoning. When this researcher analyzed the answers provided by those with symptoms of depression and those with no symptoms for erroneous reasonings that were provided by the Ennis-Weir Critical Thinking Essay test, it was noticed that participants in both groups could identify flawed reasoning statements. In some cases, those participants with the highest reported symptoms of depression elaborated more about the illogical statements and appeared to make stronger connections between ill-formed arguments compared to the participants with no reported symptoms of depression. This finding may suggest that some of the participants in this study, including some of those with symptoms of depression and those with no symptoms of depression, were both effective at applying critical thinking skills to a hypothetical situation. This study did not examine participants' ability to apply critical thinking skills to interpersonal problems. A study that assesses participants for critical thinking skills related to the participants' own personal problems might yield different results than this study obtained.

A fourth variable that may have affected the results of this study is that it may be hard to detect differences in critical thinking because some students with depression are likely to be more proficient at critical thinking than others are. Turner, Thompson, Huber, and Arif (2012) found non-statistical differences among 1,280 university students between depression level and cumulative grade average. Hysenbegasi, Hass, and Rowland (2005) found that diagnosed depression was associated with a 0.49 point, or half a letter grade, lower compared to college students with no reported symptoms of

depression. If there are small differences in cognitive abilities, such as shown by Hysenbegasi et al., then any difference in critical thinking between participants with symptoms of depression and those with no symptoms of depression is likely to be small as well.

In addition, significant differences may not be found between symptoms of depression and education level. Lehmann's (1963) reported that graduate students made significant gains in critical thinking skills between the time they entered the university and four years later as senior students. Zascavage, Masten, Schroeder-Steward and Nichols (2007) found that between 195 undergraduate and graduate students in special education, that the graduate students were significantly more capable of critical thinking (as measured by the WGCTA, 1964) compared to the undergraduate students. However, Girot (2000) found that for nursing students and nurses, there were no differences in critical thinking abilities among first-year undergraduate students, senior undergraduate students, graduate students, and nongraduate practitioners, as measured by the WGCTA.

In this study, the graduate students scored higher on critical thinking skills compared to the undergraduate students. This difference in critical thinking scores leads to an assumption that age difference of the participants may play a role in finding significant differences between critical thinking and education level and symptoms of depression. After a search of the literature, this researcher found only a limited number of studies that directly examine a relationship between critical thinking skills and age. White et al. (2015) assessed community college students' critical thinking skills with the WGCTA to examine if age was correlated with critical thinking. White et al. grouped the

participants by the following ages: 18 – 20, 21 – 24, and > 24. There were only two participants in the > 24 group, so the researchers grouped them with the 21 – 24 category. White et al.'s study did not have a diversified age category for students older than 24 years of age. In Azizi-Fini, Hajibagheri, and Abid-Hajbaghery's (2015) study, no significant differences were found between freshmen and senior students' critical thinking skills and age (freshmen mean age of 20.5 $\pm$ 1.73 years and senior mean age of 22.41 $\pm$ 1.51 years). Ardelt (2010) examined if there were differences between college students and older adults and wisdom. Ardelt compared college students (ages 20 to 22) to an older group comprised of 178 participants (ages 52 to 87) from local social groups. Of the older group, 56% had a college degree and 44% had no college degree. The participants' level of wisdom was assessed with the 3D-WS (Ardelt, 2003) that measures for cognitive (assess an individuals' desire to seek for deeper meanings of life), reflective (assesses an individual's desire to perceive phenomena from multiple perspectives), and affective (assesses the ability to recognize one's negative emotions). This researcher ran an ANOVA test to analyze the age variable in this study for the age groups of 18 – 29, 30 – 44, 45 – 59, and 60 and older. The results yielded an F ratio of $F(1, 75) = 1.089$, $p = .359$, $\eta^2 = .001$. The sample size effect of eta squared was low based on the comparison of Cohen's *d* (J. Cohen, 1988). There were no statistical differences between critical thinking and age found in this study.

What can be Learned from the Results of This Study

Although non-significant results were found in this study unless outliers were removed from the data for the variables of need for cognition and education level, it is

important to note that this study did research an area of the literature where gaps exist by examining the variables of depression and education with critical thinking skill and the need for cognition. A few possible variables were mentioned in the previous section that may have impacted the results of the study. From observation of this study's data, this researcher found that participants, those with symptoms of depression and those without symptoms of depression, could engage in critical thinking. Participants from both depression categories self-reported that they like thinking about ambiguous information.

This researcher suggests that there is still a need left for researchers to identify the reasons for the inconsistent findings about the relationship between cognitive ability and the symptomatology of depression found in the literature. A review of the published studies located while completing this study have shown that there appears to be more studies than not that have reported significant findings between cognitive impairment and symptoms of depression. Researchers in the future may want to confirm the results of this study and assess participants on being able to apply critical thinking to one's own personal problems, and to include participants who have received confirmation of a clinical diagnosis of major depression from a licensed clinician. This study did not support Beck's assumptions about negative cognition. Another area of research that may be important is to assess people with depression for other cognitive errors, such as the biased assimilation effect (C. G. Lord, Ross, & Leeper, 1979) and belief polarization (Kardash & Scholes, 1996) that were described in Chapter 1 of this dissertation. The two phenomena suggest that people, irrespective of whether they have depression or not, tend to hold onto their initial believes and dismiss new information that might disconfirm a

person's original belief. People in general tend to make cognitive errors, such as overgeneralization, and being a critical thinker can assist a person in recognizing such errors and correcting them so that the individual can avoid the continuation of faulty beliefs.

Implications for Social Change

The results of this study do not support Beck's theory of negative cognition and cognitive errors. Although the results of this study indicated that some college students with depression employed critical thinking about a hypothetical case story at what might be considered a proficient level, there were no significant differences in the two group's ability to critical think. College students with depression may tend to desire to think about the meaning of ambiguous situations by integrating information about past experiences with current events, but perhaps in a way that may lead to the effects of an emotionally charged mood if those negative, untruth beliefs persist.

Today, many existing treatment approaches for depression incorporate reflective thinking where patients think about their own self-defeating thoughts and test the distorted negative thoughts for reality so that they can learn to control distorted thinking despite negative cognitive statements (Gordon, N. S., 2000). People's cognitive abilities, such as the ability to generate alternatives, can vary depending on the level of cognitive development (Gordon, D. E., 1988). Gordon (1988) expressed the importance for a therapist to understand the patient's current cognitive structural level in order to provide an effective intervention whether it is for children, adolescents, or adults. Fielder (1993) argued that cognitive capabilities of hypothetical-deductive reasoning is an essential

component of psychotherapy, but that evidence in the literature suggests that patients' cognitive function to reason hypothetically about common problems may be problematic for therapy techniques. Thus, the social implication of this study is for researchers to further investigate whether critical thinking skills is related to the symptomatology of depression because of how it is believed that the quality of the outcomes of thought depend on the extent of the individuals' reasoning about the information available to them (Norris & Ennis, 1989).

There are two lines of research that may help suggest the importance of the recommended social implications. One, psychological distress can affect one's ability to concentrate and engage in higher cognitive mental processes (Jung, Wranke, Hamburger, & Knauff, 2014). A characteristic of major depression is a negative mood state according to the *DSM* (5th ed., APA, 2013). The negative emotion and mood state may obstruct the individual's ability to concentrate and perform cognitive tasks, such as critical think and problem solve. This researcher concludes after an analysis of the literature and this study's data results, that not all people with symptoms of depression experience a cognitive deficit in functioning or that the cognitive impairment. Some participants with symptoms of depression could think critically at a proficient level. However, the ways in which a person with symptoms of depression thinks about interpersonal problems or one's future could influence one's mood. According to Beck (1967), automatic negative thoughts that arise from negative schemas devoid people with depression from feelings of pleasure or motivation to achieve set goals. According to Conaghan and Davidson's (2002) research study, participants with either depression or parasuicidal reported a

decreased positive future compared to a control group with no reported symptoms of depression.

Second, according to Billings, Cronkite, and Moos (1983); Haugh (2006), and Marx et al. (1992) participants with symptoms of depression tend to use avoidance as a coping style and are less likely to initiate solving their problems compared to participants with no symptoms of depression. The results of the literature about problem solving orientation presented in Chapter 2 of this literature may suggest that an avoidance style of problem solving may decrease the chances of a person with depression to initiate deeper thinking about how to defeat and challenge self-defeating statements or carry through a problem-solving process for one's personal problems. If the participants in this study tended to exhibit an avoidance style of problem solving, that my impact their desire to fully engaged in critical thinking about their negative thoughts. However, this study did not analyze the participants' problem solving style.

Summary

Major depressive disorder has various negative consequences for the individuals who suffer with it. The symptoms of MDD can affect the individual's ability to function normally as one would on a daily basis, his or her relationships with family and friends, and the ability to be productive in the workplace, communities, and society at large. Beck (1967) theorized that cognitive function related to stress results in dysfunctional thought and negative mood states characteristic of MDD. The results of the study did not support Beck's theory about cognitive dysfunctional thinking in relation to using critical thinking skills to a hypothetical situation. The results of this study showed that college students

with symptoms of depression and no symptoms of depression could reason a hypothetical situation and use critical thinking skills to do so. After the outliers from the data set were removed for the DV of need for cognition, the results showed a statistically significant difference for education level. Graduate students showed a greater desire to think about ambiguous information and problem solve compared to undergraduate student. The results of this study have implications for the conversation about depression and the symptomatology of depression. By continuing to research the topic, greater awareness of the etiology of depression can be made.

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Appendix A: Demographic Questions

Please read the items below and check one box for each item. The information below will only be used for this study and will be kept confidential.

What is your educational level?

- ☐ Undergraduate
- ☐ Graduate

What is your age?

- ☐ 18 to 29 Years
- ☐ 30 to 44 Years
- ☐ 45 to 59 Years
- ☐ 60 and older

Gender

- ☐ Male
- ☐ Female

Are you an online student or are you a traditional student who attends a physical college or university?

- ☐ Online Student
- ☐ Traditional Student
- ☐ Online and Traditional

What is your race?

- ☐ American Indian or Alaskan native
- ☐ Asian or Pacific Islander

- Black/African American
- Hispanic/Latino
- White/Caucasian
- Other (please specify)

Appendix B: Permission to Use the Zung Self-Rating Depression Scale

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Appendix C: Permission to Use the Need for Cognition Scale

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Title: The Efficient Assessment of Need for Cognition
Author: John T. Cacioppo, Richard E. Petty, Chuan Feng Kao
Publication: Journal of Personality Assessment
Publisher: Taylor & Francis
Date: June 1, 1984

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Appendix D: Permission to use Ennis-Weir Critical Thinking Essay Test

On Sat, Oct 3, 2015 at 10:43 AM, Robert Ennis wrote:

Dear Jill Maschio,

I give my permission to you to use the Ennis-Weir Critical Thinking Essay for your dissertation, so long as you do not change the test.

Appendix E: Data Collection Process Changes

The original study design included the Halpern Critical Thinking Assessment: S2 (HCTA-S2; 2013). The researcher originally had the study listed on the participating university's participant pool site. The study invitation asked interested participants to email the researcher an email address where the researcher could send a specific website URL through SurveyMonkey.com so that each participant could access the electronic Halpern Critical Thinking test (HCTA-S2; 2013), and then complete the SDS by answering whether they had experienced a variety symptoms associated with depression during the past 2 weeks. The participants were to answer the questions from the NCS-SF and demographic questions. The participants were then directed on how access and complete the HCTA-S2 on Schuhfried GmbH's (2013) website. After the participants had completed the study, the researcher was going to send an e-mail through SurveyMonkey.com's e-mail system containing a debriefing form and information about how to access the $10 gift card as thanks for participating in the study.

After a few weeks of still no interest in the study, the researcher modified the study to exclude the HCTA-S2, which would have taken the respondents 20 minutes to complete, and replaced it with the respondents reporting their GPAs from a critical thinking course. This change made the researcher eligible to use SurveyMonkey's Audience service. Upon the IRBs approval, the researcher had SurveyMonkey.com send out invitations to respondents who matched the criteria of college student to participate in the study. SurveyMonkey.com's Audience service allows researchers to connect with registered members to participate anonymously in surveys. Through

SurveyMonkey.com's system, each potential participant was entered into a sweepstakes drawing for $100, and Surveymonkey.com donated 50 cents to a charity. Each potential participant had the opportunity to agree to sign the informed consent, which conformed to the guidelines of the American Psychological Association's (2010a) ethical principles and code of conduct. After collecting the data, the researcher analyzed for possible misunderstanding when respondents were asked to provide a GPA for a critical thinking course because the score is generally used as an aggregated one.

Upon the IRB's approval to change the data collection process, the researcher used SurveyMonkey.com's website so that the participants could complete the SDS (Zung, 1965), the NCS-SF, the Ennis-Weir Critical Thinking Essay test (1985), and the demographic questions. Due to a high number of incomplete survey responses, Surveymonkey.com closed the study before the researcher obtained the required number of participants for the study.

The researcher then received IRB's approval to recollect data for a new data set. Any data collected prior to the approval was discarded from the data analyses. The recruitment process included soliciting participants through Internet websites. The chosen websites included the participating university's participant pool and www.FindParticipants.com, www.WeSearchTogether.org, and Hanover College Psychology Department's online research website. The volunteers who signed the informed consent electronically and completed the three instruments comprised the entire new sample.

After 14 months of collecting the data, enough data had been collected for the groups with no depression and mild-to-moderate depression. The study was lacking several participants with severe levels of depression. Due the difficulty of having participants with severe levels of depression in the study, this researcher received permission to change the research design to include two levels of depression instead of three (no depression and depression). This researcher does not believe that reducing the number of groups with depression would necessarily have a significant impact on the data results due the mixed literature about a correlation between the severity of symptoms of depression and cognitive ability (Rush, Weissenburger, Vinson, & Giles, 1983; Stordal et al., 2004; Sweeney, Wetzle, & Stokes, 1989). Some studies have shown significant differences in cognitive abilities between participants with symptoms of depression and no symptoms of depression (Ilamkar, 2014; Ilsely, Moofoot, & O'Carroll, 1995). Some studies have shown that certain cognitive abilities may be correlated with the levels of severity of depression (Stordal et al., 2004). Stordal et al (2004) found participants with varying levels of depression to perform lower on eight of the 10 neuropsychological tests. Grant, Thase, and Sweeney (2001) assessed one hundred twenty-three outpatients for major depressive disorder without psychotic features using a structured clinical interview and for the severity of symptoms using the Hamilton Rating scale for Depression (HRSD; Hamilton 1960). The group was tested on a battery of neuropsychological tests to evaluate cognitive functioning: attention, motor speed, memory and learning, and executive processes. The scores were compared to a control group that comprised of 36 healthy individuals. The results showed that there was an absence of significant cognitive

impairment on the majority of the standardized cognitive tests in the group with major depression; however, the results showed that higher symptom severity scores were not associated with impaired functioning on attention, memory, executive functioning, or psychomotor functioning, but modest differences were found for attentional shifting and psychomotor speed.

The purpose of this study was to examine if there are differences in critical thinking skills and the need for cognition between those who self-report symptoms of depression and those who self-report no symptoms of depression. This study did not seek to identify if there are differences in critical thinking skills and the need for cognition based on levels of severity of depression. Due to the purpose of this study, this researcher believes that the change in the research design is defendable.